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## THE NORSEMEN IN AMERICA.*

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During early times the world appeared to mankind like a fairy tale; everything that lay beyond the circle of familiar experience was a shifting cloudland of the fancy, a playground for all the fabled beings of mythology; but in the farthest distance, towards the west and north, sea, land, and sky were merged into a congealed mass—the realm of darkness—and beyond this gaped the immeasurable mouth of the abyss, the terror of empty space.

Thus it remained during the early Middle Ages. In those days, Northern England was near the border of the known world. The great change was brought about by the Norsemen. With their remarkable power of expansion they extended their wanderings over Western and Southern Europe, and penetrated the vast unknown solitudes in the north. They found their way to the White sea, and lands beyond; they discovered the wide Arctic ocean and its lands; they settled in the Scotch islands, found and colonized the Faroes, Iceland, Greenland, were the discoverers of the Atlantic ocean and of North America.

Above all, they were the great pioneers in traversing the ocean. Before them, all navigation had been more or less coast navigation, the ships sailing chiefly along the coasts from place to place, and never venturing very far from the known land. The general idea of the world made it an island, surrounded on all sides by the sea, beyond which was the darkness of the unknown. The Norsemen destroyed, by their discoveries,

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these learned ideas; in their small undecked vessels, they sailed across the outer ocean, and found lands beyond. Thus they taught humanity the art of oceanic navigation, which marks in reality perhaps the greatest discovery in the history of exploration.

The first informations about the northern discoveries of the Norsemen are met with in England, in King Alfred's Anglo-Saxon edition of Orosius's history, at the close of the ninth century. A later source is the description of the islands of the North, written by Adam of Bremen, about 1070. But by far the most important part of our knowledge of the discoveries of the Norsemen is derived from the Norse-Icelandic literature of the

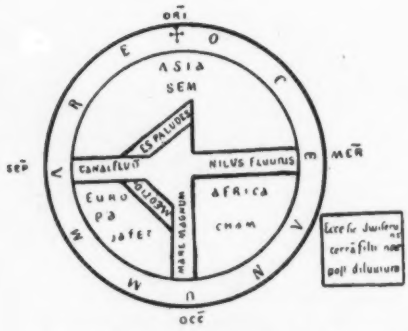


FIG. 1.—MAP OF THE WORLD IN THE MS. OF ISIDORE, TENTH CENTURY, ST. GALLEN (K. MILLER).

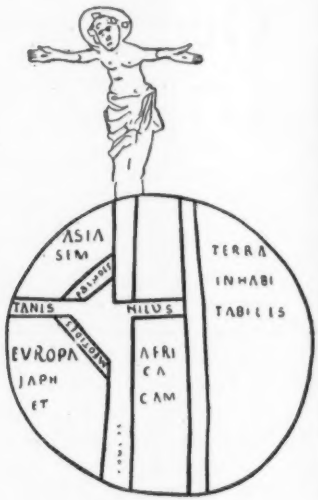


FIG. 2.—THE OLDEST KNOWN MAP OF THE WORLD, FROM THE MS. OF ISIDORE OF THE END OF THE SEVENTH CENTURY, ST. GALLEN (K. MILLER).

twelfth, thirteenth, and fourteenth centuries, chiefly put into writing in that strange island Iceland, rising with its black volcanoes and lava-fields, and its white snow-glaciers above the dark waves of the Northern ocean, "like the waste chaotic battle-field of Frost and Fire." A sombre undercurrent runs through these narratives of voyages across unknown seas; even though they may be partly legendary, they nevertheless bear witness to the silent enduring struggle of hardy men with ice, storms, cold, and want, in the light summer and the long dark winter of the North. Fancy what it meant to cross the stormy and often misty Northern seas in those days, or to cross the Atlantic in those vessels. They had no compass for finding their course, no instrument for finding their place,

only the sun and the stars to steer by; but what when there were none to be seen for days, perhaps for weeks? We know that many of them found their way, but do not know how many more were lost and never heard of. And still they went on. I cannot think of them without remembering Carlyle's words about these "old true sea-kings!" What an indomitable rugged energy! In their small undecked vessels, they forced their way across the dangerous waters into the unknown, "silent, with closed lips, unconscious that they were specially brave."

But we cannot go deeper into this absorbing subject now. To-night I propose to discuss what the old literature has to tell about the Norse

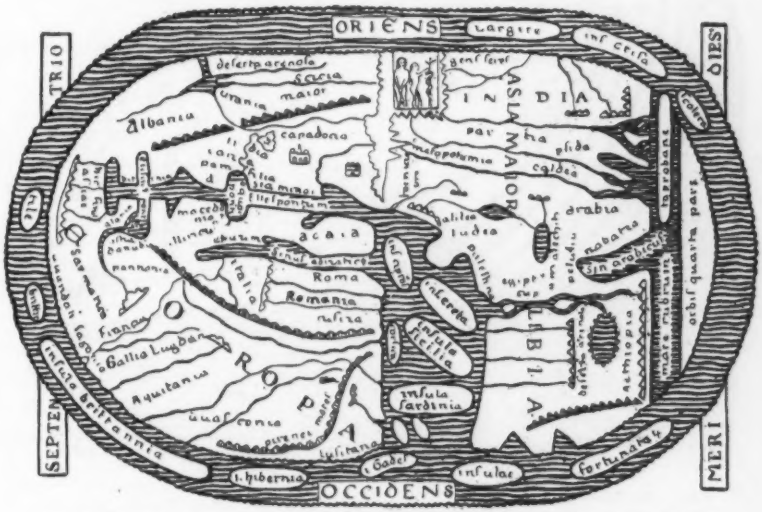


FIG. 3.—THE SO-CALLED ST. SEVERUS VERSION, OF ABOUT 1050, OF THE BEATUS MAP (EIGHTH CENTURY).

discoveries in the farthest West, and especially what is told of that wonderful land called "Wineland the Good."

As is well known, the Norse Icelanders, led by the Norse chief Eric the Red, discovered Greenland, and founded two settlements on its south-western coast in the end of the tenth century. It seems probable that not very long after this, weather-beaten seafarers from Greenland discovered lands still farther towards the west or rather towards the south-west. The Icelandic literature contains remarkable statements about such countries. They are called: "Helluland" (*i.e.* Slate or Stone-land), "Markland" (*i.e.* Woodland), "Furðu-strandir" (*i.e.* Marvel-strands), and "Wineland the Good." Yet another, which lay west of Ireland and

not far from Wineland, was called "Hvítramannaland" (*i.e.* the white men's land), or "Great Ireland." Although some of these countries are legendary, as we shall see, it must be regarded as certain that the Norsemen reached some of them, which lay on the northern east coast of America; and they thus discovered the continent of North America, besides Greenland, about five hundred years before Cabot (and Columbus).

Quite a different question is it, however, whether those accounts of voyages to these countries, which we find in the Icelandic sagas, are historical. Whilst most historians now agree that Hvítramannaland, or Great Ireland, and the account of Are Márson's voyage thither are merely

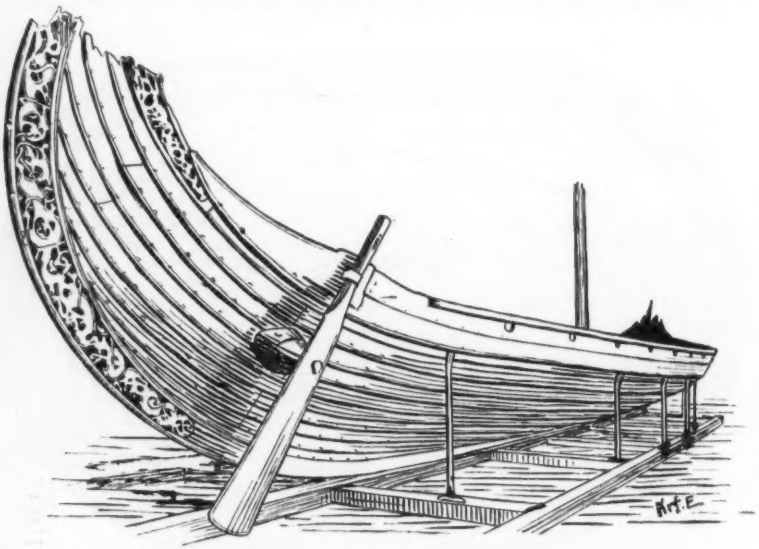

FIG. 4.—A VIKING SHIP FROM OSEBERG, NEAR TONSBERG (NINTH CENTURY).

legendary, it has been universally accepted as an established fact that Wineland was some part of America, and that the accounts of the discovery of this country and voyages thither were historical. My researches have, however, led me to very different views. The story of the discovery of Wineland is the following, according to what is considered to be the most trustworthy accounts.

Some time after Greenland had been discovered by Eric the Red, and the Norsemen had settled there about 985, Eric's son, Leif, sailed to Norway from Greenland, it has been said, in the year 999. This is the first time a voyage straight across the Atlantic is mentioned in literature. Leif came to King Olaf Tryggvason in Norway, and spent the winter there. He adopted Christianity and promised the king to try to introduce the

faith in Greenland. In the spring, he set out again to sail straight across the Atlantic to Greenland. But he was driven out of his course, and "for a long time drifted about in the sea, and came upon countries, of which before he had no suspicion. There were self-sown wheatfields, and vines grew there." He also found large trees, which he took home with him to Greenland, where he introduced Christianity. He was afterwards called Leifr hinn Heppni (*i.e.* Leif the Lucky).

In the following year, Leif's brother Thorstein is said to have made an attempt to find the land Leif had discovered, but was unfortunate, and was drifted eastwards towards Iceland and Ireland.

The next year, an Icelandic merchant, Thorfinn Karlsevne, who had come to Greenland, equipped a new expedition. They sailed out with

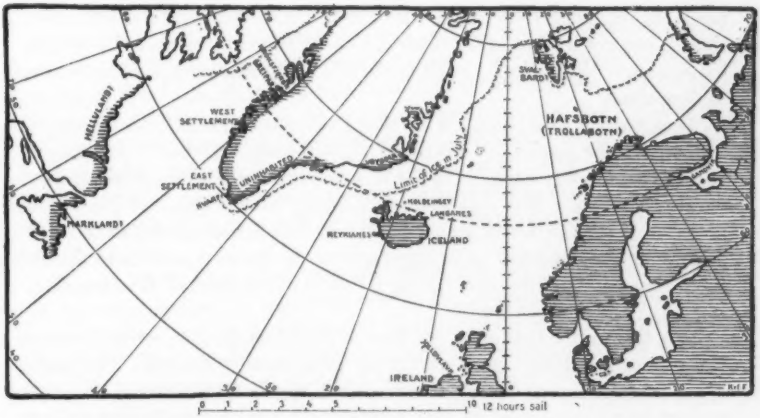


FIG. 5.—COUNTRIES AND SEAS DISCOVERED BY NORWEGIANS AND ICELANDERS. THE SHADED COASTS WERE PROBABLY ALL KNOWN TO THEM. THE SACLE GIVES "DŒ GR"-SAILING, RECKONING 2 (OR 129 GEOGRAPHICAL MILES) TO EACH "DŒ GR'S" SAIL.

three ships,—it was evidently supposed towards the south. After two days, they came to a land, which they called Helluland (*i.e.* Slate or Stone-land), on account of the many flat stones. After two days more, they came to a land they called Markland (*i.e.* Woodland), on account of the forests. When they had once more sailed for two days, they sighted land, and came to some extensive sandy strands which they called "Furðu-strandir" (*i.e.* Marvel-strands). They now sailed southwards along the coast, wintered in a fjord, went on next year, and then they came to the land with vines and self-sown wheat. They stayed the winter there, but were attacked by the natives, called Skrælings, and had to withdraw northward. After having spent the third winter in the same fjord where they had been the first winter, Karlsevne returned to

Greenland with one ship, whilst the two other ships had been drifted towards Ireland and lost.

This is very briefly the story of the discovery of Wineland, and the attempt at a settlement there, as told in the saga of Eric the Red, which is generally considered to be the most trustworthy source. But this saga was not written till the thirteenth century, perhaps some year between 1270 and 1300; that is, 250 or 300 years after the time when the events are said to have occurred. It might seem desirable to find some earlier evidences, in order to strengthen one's faith in the trustworthiness of the account. But the unfortunate fact is, that the earlier literature contains hardly any indication of these voyages. The name "Wineland," or "Wineland the Good," is mentioned, but nothing is told about its discovery, and in the chief source of the Icelandic history, the Landnámabók, probably originally from the twelfth century, Leif Ericson's name is mentioned, but not a word of his discovery of Wineland; nor even has he got his surname "the Lucky," or is it mentioned that he introduced Christianity to Greenland.

It is not till well on in the thirteenth century that Leif's surname of "Heppni," the Lucky, his discovery of Wineland, and his Christianizing of Greenland are mentioned in the Kristni-saga and the Heimskringla by Snorre Sturlason. But still there is nothing about vine. It is not till the close of the thirteenth century that any information occurs as to what and where Wineland was (with statements as to the vine and wheat there), and a description of voyages thither; this is in the Saga of Eric the Red, as I have already mentioned.

But then, after that time, we find in the Flateyjarbók, written about 1387, quite a different story about the voyages to Wineland. The land, it is told, was discovered by a man called Bjarne Herjolfsson, Leif Ericson not being mentioned in that connection; the one expedition led by Thorfinn Karlsevne has been divided into four different expeditions, one of them being led by Leif Ericson, etc. It seems to me to weaken our faith in the whole story, that the two only known narratives of these voyages disagree to such an extent, and that even the first of them has been put into writing so very late. The historians have tried to get out of the difficulty by declaring the account of the Flateyjarbók to be unhistorical, and more or less fictitious, whilst Eric the Red's saga should be perfectly trustworthy. This is an easy method, but one feels tempted to ask whether it is reasonable to suppose that the traditions should have been handed down by word of mouth in such a remarkably unaltered and uncorrupted state as the historians pretend, during the first 250 or 300 years, when we see that they have been transformed and confused to such an extent scarcely a hundred years later? This can hardly be admitted to be psychologically probable.

If one's faith in the accounts of the Wineland voyages is seriously shaken by facts such as these, I think it will be still more so by studying

the details of the account in the Saga of Eric the Red, which has been declared to be most trustworthy.

Let us first consider the description of the most important discovery, Wineland itself. The oldest known source, in which Wineland is mentioned, is Adam of Bremen's description of the islands in the Western and Northern ocean. After having described the Orkneys, Iceland (Thule), Greenland, Halagland (the northern part of Norway, which he makes into an island), he says that King Svein of Denmark "mentioned yet another island, which had been discovered by many in that ocean, and which is called Wineland, because vines grow there of themselves and give the best wine. And that there is abundance of unsown corn we have obtained certain knowledge, not by fabulous suppositions, but from trustworthy information of Danes. Beyond this island, he (*i.e.* the Danish king) said, no habitable land is found in this ocean, but all that is more distant is full of intolerable ice and immense darkness. . . ."

This description of Wineland has remarkably close resemblances to legendary ideas met with in earlier literature. The two distinguishing features of Wineland, the self-grown *vine* and the unsown *corn* (or wheat), are exactly the same as those we find in the description of the Fortunate Isles in Isidorus Hispalensis from the seventh century, who characterizes them as being the islands with "self-grown vines" and "cornfields" (*i.e.* wheatfields) growing wild like grass. These isles were in the western ocean, originally west of Africa (Mauritania or Morocco). They were the African islands.

Beyond Wineland was the dark sea filled with ice. This is evidently the dark and curdled sea which we find in the legends of antiquity, even before Pytheas, and during the early Middle Ages and in the legends of the Arabs. This dark congealed sea formed the boundary of the world, especially towards the north and west, and in its immediate neighbourhood were the Fortunate Isles. It is indeed a remarkable coincidence that these same features, the self-grown vine, the wild-growing corn, and the situation near the dark sea, are the distinguishing features mentioned for Wineland as well as for the Fortunate Isles. Even as far back as the time of Homer's Odyssey, Sheria, the happy land of the Phœacians, in the ocean far to the west was shrouded in darkness. Adam says that his island Wineland had been discovered by several, but does not give any names (which he, however, does in some other cases); this may also suggest the Fortunate Isles, because there were many tales current about voyages thither.

In the Icelandic literature, the name Wineland is first mentioned by Are Frode in about 1130. While mentioning the natives of Greenland, he says that they are the same people that inhabit Wineland, and are called Skrælings. But what and where Wineland is, he does not say; it may be a really discovered land, or it may be a fairyland, perhaps well known at that time from fairy tales and legends. As the name "Skræling," which

was applied to the Eskimo of Greenland, was very probably before that time used as a name for gnomes or brownies or mythical beings, the possibility of Are's Wineland being a fairyland is much increased. In Arabic and also in Irish legends, similar mythical people are described as inhabiting some of the Fortunate Isles in the Western ocean, and the descriptions have features resembling those of the Skrælings in Wineland. The probability that Are's Wineland is a fairy-land, is strongly supported by the next mention of Wineland in the Icelandic literature, in the Landnámabók, where it is only said that Hvítramannaland (the white men's land), also called Great Ireland, lay near Wineland the Good. As Hvítramannaland was a mythical land from Irish legends, as can now be proved with certainty, the probability is that Wineland the Good, which was near it, was also mythical. But as the statement in the Landnámabók originates from Are Frode, there can hardly be much doubt that his Wineland inhabited by Skrælings was the same mythical land.

Before the Saga of Eric the Red, the Icelandic literature has practically nothing more to tell us about Wineland the Good, with the exception of the before-mentioned statement in some sagas from the thirteenth century that it was found by Leif Ericson. In Eric the Red's saga, we get, however, at last a description of the land, according to which it lies somewhere to the south or south-west of Greenland, and we hear about Thorfinn Karlevne and his men that "there they found self-sown wheatds, where the land was low, but vines wherever they saw heights." Let us compare this with what Isidore says of the Fortunate Isles. His description is—"The Fortunate Isles denote by their name that they produce all good things, as though fortunate and blessed with fertility of vegetation. For of their own nature they are rich in valuable fruits. The mountain-ridges are clothed with self-grown vines, and cornfields and vegetables are common as grass" (*i.e.* grow wild like grass, are self-grown). It must, I think, be admitted that the likeness between the two descriptions is so close that it cannot be explained away as fortuitous; it would be a remarkable coincidence indeed if there is not some connection between them. Furthermore, we hear in the saga that when Leif Ericson discovered the land to the west, which, however, is given no name, he found there self-sown wheatfields and vines and big trees. It is also stated that the climate of Wineland was so mild, that "there fell no snow at all, and the cattle were out during the whole winter, and fed themselves," the streams and the sea teemed with fish, and the woods were full of deer, and when the Norsemen first came there they did nothing but amuse themselves, etc.

The general ideas of the Fortunate Land, or Isles of the Blest, far out in the ocean in the West, were exactly similar. Pliny describes the lofty trees of the Fortunate Isles; already in the Odyssey, we hear about the Elysian Fields in the West on the borders of the Earth:

"There is never snow, never winter nor storm, nor streaming rain,
But ocean ever sends forth the light breath of the west wind
To bring refreshment to men."

And the fortunate isle of Syria towards "the region where the sun sets" was "rich in oxen and sheep, and clothed with *vines* and *wheat*."

Again *Diodorus* from Sicily describes a land opposite Africa in the middle of the Atlantic ocean as unusually fertile. It invites to amusements and delights. It has thick forests and all kinds of fruitful trees, and many streams, there is game of all sorts, big and small, the sea is full of fish. The air is extremely mild, and there is plenty of fruit the whole year round, etc. Precisely like Wineland. The land was not known in former times, but some Phœnicians, on a voyage along the African coast, were overtaken by a storm, were driven about the ocean for many days, until they came thither, just like Leif Ericson.

Horace, in one of his Epodes [XVI., 39 ff.] exhorts the Romans, who were suffering from the civil wars, to abandon the coast of Italy, and sail from all their miseries to the happy land, the Fortunate Isles in the West.

"Lo! where awaits an all-circumfluent ocean—
Fields, the blest fields, we seek the golden isles,
Where teems a land that never knows the ploughshare,
Where, never needing pruner, laughs the vine."

We see the same ideas, the happy land "where the untilled earth, not knowing the ploughshare, gives corn every year, and the vine uncut (*i.e.* growing wild) continually flourishes." Can we be in doubt that it is the same land, the happy land in the West, which is here described as well as in the Icelandic sagas? Is it not the same happy land far out at sea, west of Ireland, the Tír na-n-Og or Tír-na-m-Beo, the Land of Youth, the Land of the Living, who calls the Irish seafarer?—

"Come dwell in our island, come live in those bowers,
Which sorrow and care never gazed upon yet;
Where true love rears altars, encircled with flowers,
The fairest and sweetest the eye ever met,

"Whose skies are unclouded, whose fountains are flowing,
With no icy chill on their soft gushings cast;
And hearts that inhabit, like the buds round them blowing,
Bloom on in their freshness, unchanged as the past!"

Yes, it is that land of happiness, which the human mind of all ages dreamt of, but which was never reached.

But now how came these ancient tales of the Fortunate Isles originally grown under a warmer sun to Iceland, the isle of mists in the north ocean? There are several ways possible. The nearest way might appear to be that they have got their ideas about Wineland from Adam of Bremen's description of the northern islands. It is, however, somewhat doubtful, whether this work was known in Iceland in the thirteenth century.

Then the Icelanders may have taken their description directly from Isidorus Hispalensis. This seems to be very probable, especially as Isidore was well known in Iceland, and we even possess old Icelandic translations of parts of his work. We thus get a natural explanation of the striking resemblance between the description of Wineland and Isidore's description of the Fortunate Isles.

But there is still a third way, which has evidently been of much importance, and that is Ireland. As is well known, Norway, and still more Iceland, were closely connected in ancient days with Ireland, and the Norse-Icelandic literature shows in many ways traces of Irish influence. In the old Irish legends, there is a whole world of such fortunate islands in the Western ocean, which have names very similar to that of Wineland, and which, to a large extent, are derived from the classical myths of the Elysian Fields, and the Fortunate Isles. Voyages to them form prominent features of most of the Irish tales and legends. There is "Ciūin" (*i.e.* the mild land) with riches and treasures of all colours, where one listens to lovely music and drinks the most delicious wine; "Mag Mon" (the plain of sports); "Imchiūin" (the very mild land); "Mag Mell" (the happy plain, the Elysian Fields of the Irish), where, without sin, without crime, men and loving women sit under a bush at the finest sports, with the noblest wine, where there is a splendid wood with flowers and fruits and golden leaves, and the true scent of vine. There is "Hy Breasail" (or "O'Brazil"), whose name is evidently derived from the Irish word "*bress*," meaning good fortune, success, prosperity. This name is consequently a translation of the name Fortunate Isles. There were many others. It is said in the ancient tale of Bran's voyage towards the west (Echtra Brain maic Febail), that "there are thrice fifty distant islands in the ocean to the west of us, each of them twice or thrice as large as Erin."

The "Promised Land" (Tír Tairngiri) with the "Happy Plain" (Mag Mell) became in the Christian Irish legends the earthly Paradise, "Terra Repromissionis Sanctorum" (the land of promise of the saints), which St. Brandan went in search of. There was also the "Insula Deliciosa" (the Delicious or Good Island), and even a "Terra Bona" (the Good Land). Many of the islands in the distant West were inhabited by the mythical *sid-people*, which may have resemblances to the Skrælings of Wineland. There seems to me to be little doubt that there is a close connection between these Irish legends and the Icelandic tales of voyages to Wineland and the other lands in the West.

Let us now consider what may be the strange name "Wineland the Good." The origin of the first part of the name, Wineland, may not seem so very difficult to explain, when we consider what an important feature the vine forms in all descriptions of the Fortunate Isles, in the classical legends, but even still more in the Irish legends. Wine, besides women, was for the old Irishmen a most necessary feature in their

ideas of happiness, and decidedly not less so for the Norsemen. It was, moreover, no northern product, but came from the south, along with the wheat, and was to the northerner, above all others, the most striking feature of the fertility of the south. No wonder, therefore, that when he wished to describe a specially fertile land where perpetual happiness dwelt, he would call it Wineland. So we see is also the case in the Irish legends. In the legend of St. Brandan (Navigatio Sancti Brandani), he and his brethren roaming the Western seas, came to a remarkable fertile Isle of Grapes (Insula Uvarum), far west. "It was covered with the thickest forests of vines, which bore grapes with such incredible fertility that all the trees were bent to the earth." This legend was written down in the eleventh century, probably about the same time when we first hear of the Norse Wineland in Adam of Bremen (about 1070), and the legend was also well known in Iceland, where even translations of it were made. "Insula Uvarum," or the Isle of Grapes, translated into the old Norse, could not very well become anything but Vinland (Wineland), or also Víney (Wine-island). But considering the existence of the other names, Iceland and Greenland, it was quite natural that the former name was preferred. We thus have the remarkable circumstance that an island with the same name and the same properties makes its appearance almost simultaneously in Ireland and in Denmark, where Adam heard it, but whither it may have been brought by a known Icelander, as there is good reason to believe.

That these Wine-islands or Winelands should have originated entirely independent of one another, in countries which had such close intellectual connection, would be a coincidence of the kind that one cannot very well assume, since it must be regarded as more probable that there was a connection. It must be remembered that Ireland was still inhabited by a great number of Norsemen at that time.

But Brandan's Grape-Island can scarcely be derived from a Wineland discovered by the Norsemen, since the wine and wine-fruit play such a prominent part in the older Irish legends of the lands in the West, as has already been mentioned. It therefore becomes probable that the Norse name Wineland was originally derived from Ireland, as is also actually indicated by the Icelandic literature, the Landnámabók, where Wineland is said to be near Great-Ireland or Hvítramannaland, the tale of which with certainty came from Ireland; and Icelanders have evidently heard both lands spoken of there.

That Wineland and the tales of the voyages thither were connected with Ireland is also proved by the story in Eric the Red's saga. I have already mentioned, that when Leif Ericson's brother went out from Greenland in search of Wineland he is said to have been carried eastwards so far that he saw birds from Ireland. Considering the great distance across the Atlantic such a statement may seem startling, but gets a natural explanation if Wineland was originally an Irish fairyland.

North of Wineland were the "Furðu-strandir," *i.e.* the Marvel-strands. This name has a striking similarity to names of the fairylands, far in the ocean west of Ireland, such as "Tírib Ingnad" (lands of marvel), and "Trág Mór" (great strand).

After having passed these strands of marvel, one small party of Karlsevne's people, led by Thorhall the Hunter, "was caught by a westerly storm, and they drifted to Ireland, and there they were made slaves and ill-treated. There Thorhall lost his life, as merchants have reported." Of another party of Karlsevne's people, led by Bjarne Grimolfsson, it is told that on their way home from Wineland, they were carried out into the Irish ocean; came into the maggot sea, and the ship was worm-eaten and sank. Half the crew saved themselves in the boat, and came to Dublin in Ireland.

It seems to me that there is no other natural explanation of these perfectly legendary tales, than that they came from Ireland, probably with merchants, as is also stated. The ship that is worm-eaten in the maggot sea reminds one of the incident in the tale of the voyage of the three sons of Ua Corra (twelfth century), where the sea-monsters gnaw away the second hide from under the boat.

To any one who is familiar with Norse place-names the addition "hit góða" (the good) to Wineland must appear foreign and unusual. In the northern countries it is otherwise only known from the name "Landegode," originally "Landit Goða," *i.e.* the good land, for an island west of Bodö," in Northern Norway, and in earlier time also for two other islands far out at sea on the west coast, and the south coast of Norway. All three islands were formerly fairylands ("huldrelande"), and the name was probably a designation of fairylands, which lay out in the ocean, and which were thought to sink into the sea as one approached them.

In the Irish legends there are quite similar ideas of the happy land "Tír fo-Thûin," the land under the wave, and the "Happy Plain," "Mag Mell," which was invisible to ordinary men, as Bran is told, when he meets on the sea Manannan MacLir (*i.e.* the son of the sea), king of the sea-people, lord of the land of the dead. The Norwegian fairy-people, or sea-people corresponding to the Irish síd-people, were called "Hulder," which means "hidden" (*i.e.* the hidden people), and the original germ of the belief in such fairies (both in Norway and in Ireland) is the worship of the departed, the hidden people. These fairylands are thus originally the islands of the hidden or of the departed, and are consequently the same as the Fortunate Isles, which were originally the Greeks' Islands of the Blest, or the departed. The lands or islands of the departed in course of time became the habitations of the invisible ones (spirits), of those who possess more than human wisdom, and have a specially favourable lot; by this means the idea of a fortunate land with favoured conditions, far surpassing the ordinary lot of men, became more and more emphasized. This development may be followed both with regard to

classical ideas of the Fortunate Islands, and to Norse conceptions of fairylands.

The foreign name "Insulae Fortunatae," or the Fortunate Isles, could not very well take any other Norse form than Landit Góða (*i.e.* land the good), which may then be a direct translation. And as in addition the fairylands, both in Ireland and in Norway, were imagined as specially good and fertile, and the huldre- and síd-people or elves are called the "good people," and are everywhere in different countries associated with the idea of "good," this gives a natural explanation of the Norse designation, "the good," both in Landit Góða, and in "Wineland the Good," being evidently a hybrid of a name, and the latter name "Wineland" and "Landit Góða," which probably originally is a translation of Insulae Fortunatae (the Fortunate Isles).

It might be objected to the view that "Wineland the Good" originally was "the Fortunate Isles," that several sorts of wild grape are actually found on the east coast of North America; it might therefore be believed that the Greenlanders really went so far, and discovered these. It has, however, to be considered that it is only comparatively far south in the present Maine, or farther south, that wild grapes are with certainty known to have occurred along the American coast. And besides, wheat was never a wild cereal in America, and it has not hitherto been possible to find any plant there which could have given the Norsemen their idea of the self-sown wheatfields. No wonder, therefore, that hardly two authors who have discussed this question have been able to agree where on the American coast the Norsemen could have found the conditions described. This is undeniably a very weak point in their defence of the authenticity of the saga. No attempt made hitherto to bring the natural conditions of the coast of North America into agreement with the saga's description of Wineland has been able to afford any natural explanation of the striking juxtaposition of the two leading features of the latter, the wild vine and the self-sown wheat, which are identical with the two leading features in the description of the Fortunate Isles. If it were permissible to prove in this way that the ancient Norsemen reached the east coast of North America, then it might be concluded with almost equal right that the Greeks and Romans of antiquity were there; for they already had the same two features in their descriptions of the Fortunate Isles in the West. Wheat and wine were to the Norsemen foreign ideas, which evidently have come together from Southern Europe, where we find them in Isidore and many others, and where they were important commercial products, often mentioned together.

Since we then have the choice, it may be more reasonable to assume that the Icelanders got their wine from Isidore, or from the same vats that he drew his from, than that they fetched it from America.

A quite remarkable confirmation of the identity of Wineland and the Fortunate Isles, which in classical legends lay to the west of Africa, and were

the African Islands, occurs in the old Icelandic geography, which is known from several manuscripts from the fourteenth and fifteenth century, but which is originally much older. There we read: "South of Greenland is 'Helluland,' next to it is 'Markland,' and then it is not far to Wineland the Good, which some think to be connected with Africa. . . ."

This idea of the connection with Africa seems to have been general in Iceland. We also find it in Eric the Red's saga, where it is said that

FIG. 6.—THE CONCEPTION OF THE NORTHERN AND WESTERN LANDS AND ISLANDS IN NORSE LITERATURE.

Karlsevne on his voyage southward in search of Wineland "wishes to go south along the coast (beyond the marvel-strands), and eastwards (evidently towards Africa). He thought the land became broader the farther south it bore." This description gives hardly any meaning, unless we assume that it is thought of the connection with Africa, which made the land extend eastwards. The idea of this connection might seem surprising; but it finds its natural explanation, if Wineland was identical with the Fortunate Isles, and in no other way, as far as I can see. The same idea also appears in Norway. Besides a reference in the King's Mirror," the following passage in the "Historia Norwegiae," relating to Greenland, is of particular importance:—

"This country (*i.e.* Greenland) was discovered and settled by the Icelanders . . .; it forms the end of Europe towards the west, and nearly touches the African Islands. . . ."

It is clear that the name "African Islands" is here used instead of Wineland, in connection with Markland and Helluland, as in the Icelandic

geography. But the African Islands (*i.e.* originally the Canary islands and the Madeira islands) were in fact the Fortunate Isles in connection with the Gorgades and the Hesperides, and thus we have here a direct proof that they were looked upon as the same.

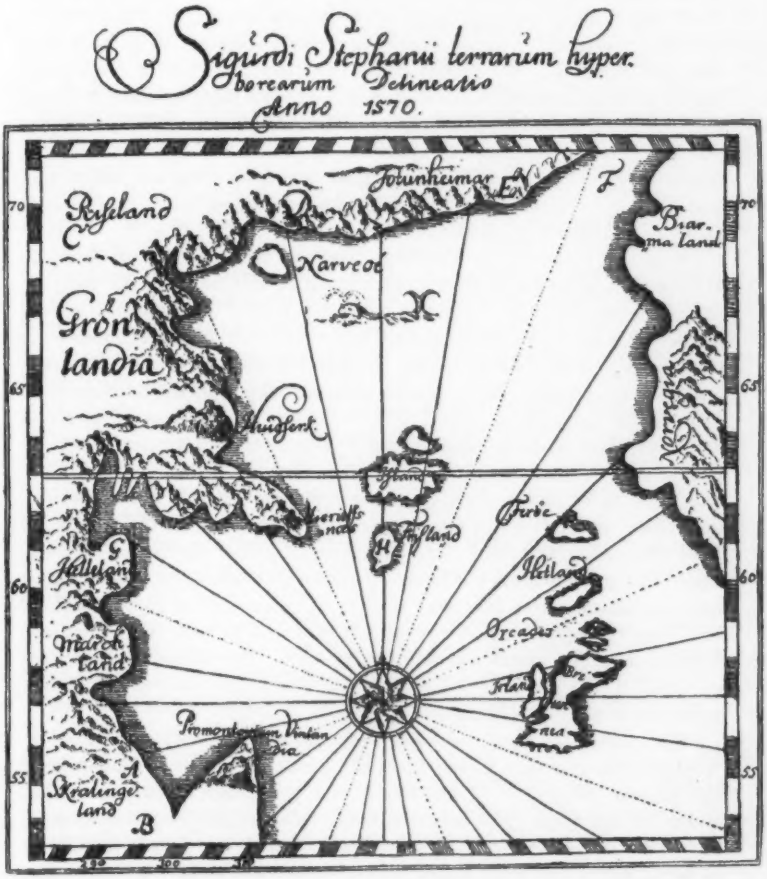


FIG. 7.—ICELANDIC REPRESENTATION OF THE NORTHERN AND WESTERN LANDS AS CONNECTED WITH ONE ANOTHER, BY SIGURD STEFANSSON, CIRCA 1590 (TORFÆUS, 1706). CF. G. STORM, 1887, PP. 28 FF.

Most of the other features of the tale of Thorfinn Karlsevne's voyage to Wineland are also in part legendary or borrowed from elsewhere, but it would take much too long a time to go into all this here. Only a few examples may be mentioned.

It has been proved that the ancient Irish tale of Maelduin's voyage in the Western ocean (Imram Maelduin) has been formed on the model of the "Aeneid," the model of which is again of course the Odyssey. The legend of St. Brandan's voyage originated chiefly from Imram Maelduin. If, however, one compares these tales of voyages to unknown islands in the Western ocean with the sagas of the Wineland voyages, it must strike one that there are great similarities in several respects. The Norsemen also go out in search of a Promised Land or happy land, called "Wineland the Good," and they first came to various unknown lands or islands. There are even small unimportant features which show great similarity. During the first wintering of their expedition Karlsevne's people were nearly starving, when a whale of a strange kind, which they did not know, was driven ashore. This resembles the great fabulous fish that is cast ashore, and that Brandan and his brethren live on.

When the natives, the Skrælings, came to Karlsevne's settlement in Wineland, it is said that they came rowing in hide canoes "as many as though it had been sown with coal before the bay." This curious and unintelligible expression seems to find its explanation in an expression in the Irish tale of Brandan's voyage ("Imram Brenaind"), where Brandan and his companions come to a small deserted land, and the harbour they entered was immediately filled with "demons in the form of pygmies and dwarfs, who were as black as coal." When Thorfinn Karlsevne and his people were attacked by the Skrælings these threw a strange big and black ball from a catapult. The ball went over the heads of the Norsemen, and made an ugly sound (report?) when it fell, so that the Norsemen were frightened and fled with all speed. In the narratives of both Brandan's and Maelduin's voyages the seafarers come to an island where the inhabitants throw fiery masses after them, but which pass over their boat and fall farther off in the sea, which began to boil, etc. They are frightened and fly hastily out into the open sea. This incident is evidently an echo of the classical Cyclops of the Aeneid and Odyssey, and the great stones that were thrown at Odysseus.

The statements in the beginning of the tale of Karlsevne's voyages to Wineland are also quite impossible. He begins his voyage by sailing from the Eastern Settlement of Greenland to the Western Settlement. This means to sail from the present district of Julianehåb northwards along the west coast of Greenland to the district of Godthåb, and he even sails as far as Björney or Bear island, which may be the Disko island, in order to sail thence towards Wineland with a northerly wind, which means southwards. The Icelandic author of the tale, not knowing Greenland geography, has evidently thought that the Western Settlement must be due west of the Eastern Settlement, and not north of it. Then Karlsevne sails to three different lands or islands in turn (Stoneland, Woodland, and the Marvel-strands) with the same number of days' sail (two days' sail) between each. Even not considering that the distances

given (two days' sail from Greenland, etc.) are perfectly impossible, it seems clear that this feature must have been taken directly from the fairy-tales, where the hero generally travels to three different lands, with the same number of days between each, and nothing corresponding to such separated three islands is to be found on the coast of America. It is perhaps also more than a coincidence that in the classical legends there were three groups of islands, the Gorgades, the Hesperides, and the Fortunate Isles to the west of Africa. This part of the description of Karlsevne's voyage reminds one forcibly of many of the old Irish legendary tales of wonderful voyages. In particular, the commencement of Imram Maelduin may be mentioned, where the hero also comes to three successive islands with three days' and three nights' sail between each, while after that they sail "a long way," "for a week," "for a long time," etc., to new lands, exactly as in the tale of Karlsevne. We thus come to the conclusion that the narrative of the Wineland voyages is a mosaic of one feature after another gathered from East and West.

But is there, then, nothing left that may be genuine? To this it may be answered that even if the romance of the voyages be for the most part invented—to some extent perhaps from ancient lays—the chief persons themselves may be more or less historical, and there are various features in the description, which seem to indicate a certain knowledge of the real conditions in the north-east coast of America. Incidents such as the bartering of skins with the Wineland Skrælings, and the combat with unfortunate results, seem to refer to something that actually took place; they cannot easily be explained from the legends of the Fortunate Isles, nor can representations of fighting, in which the Norsemen were worsted, be derived from Greenland. They may rather be due to encounters with Indians.

The very mention of the lands, first the treeless and rocky Helluland (Labrador?), then the wooded Markland (Newfoundland?) farther south, and then the fertile Wineland, may also point to local knowledge; but can be explained away as having been put together from the general experience, that countries in the North are treeless, but become more fertile as one proceeds southwards. The names Helluland, and especially Markland have in themselves an appearance of genuineness, as also has Kjalarnes. The surest historical evidence that voyages were made to America from Greenland is the chance statement in the Icelandic Annals, that in 1347 a ship from Greenland, which had sailed to Markland, was driven by storms to Iceland. This was written down not many years after the event, perhaps only fifteen years later; it may be considered as quite certain that this ship had been to Markland; and this reveals the fact that, occasionally at any rate, this voyage was made, probably in order to fetch wood and timber, which were scarce, and very valuable in Greenland. A prominent feature of the different tales of the Wineland voyages is also that of the Greenlanders bringing timber from thence.

I may still mention another interesting evidence of quite a different kind. Mr. Ebbe Hertzberg has shown that there is a remarkable similarity between that peculiar ball-game of *lacrosse*, which is played by the Indians of the north-east of North America, and the ancient Norse ball-game "knattleikr," which was a favourite game in Iceland according to the sagas. The similarity seems to be perfect even in small peculiar details which would indeed be difficult to explain, unless there had been some connection. This game has a wide distribution among the Indian tribes of Canada and United States, and must have been introduced at an early period. Dr. Hoffmann, who describes it, thinks that it is undoubtedly derived from one of the Eastern Algarkin tribes, possibly in the valley of St. Lawrence. This, then, points to its having originated just in those

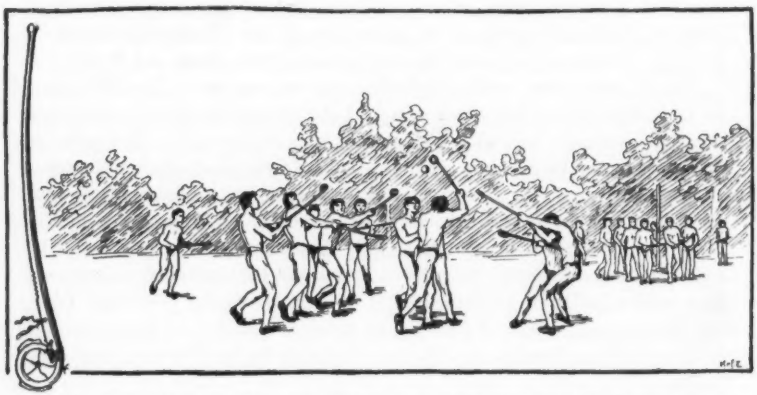

FIG. 8.—THE GAME OF LACROSSE AMONG THE MENOMINI INDIANS (AFTER W. J. HOFFMANN, 1896). ON THE LEFT, A "CROSSE," ABOUT A YARD LONG.

districts where one would expect it to come from, if it was brought by the Norsemen, as Hertzberg thinks. In support of his view I may also mention that the Icelanders appear to have introduced the same ball-games to another American people with whom they came in touch, namely, the Eskimo of Greenland. According to Hans Egede's description they had a very similar game. If Hertzberg is right in his supposition, as I consider to be probable, this would lend strong support to the view that the Norsemen had considerable intercourse with America and its natives.

The results of these investigations would then be that the Norsemen have discovered America, and have had intercourse with the land and its natives probably during some long period; but the narratives of this discovery and of voyages to Wineland are legendary. The Icelanders and the Greenlanders may have transferred the ideas, especially of the Fortunate Isles, from the legends to the discovered land; and the saga

of Wineland the Good has then been gradually formed in the course of time, by putting together feature after feature from old tales and legends, with some such real knowledge of lands in the West. This saga, as we know it in the saga of Eric the Red, is, however, written in a masterly way, which we must highly admire. The Icelanders thus created the realistic novel; and at a time when the prose style of Europe was still in its infancy, their prose narrative often reaches the amount of clear simplicity.

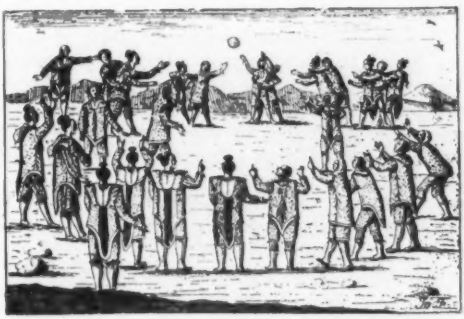

FIG. 9.—GAME OF BALL AMONG THE ESKIMO OF GREENLAND (HANS EGEDE, 1741).

It is strange, however, that while in the realistic novel of Wineland, the Fortunate Isles have evidently been intermixed with the discovery of America by the Norsemen; the same happy land far out in the ocean west of Ireland was again the luring goal, when the American continent was rediscovered from England.

"On the ocean that hollows the rock where ye dwell,
A shadowy land has appeared, as they tell;
Men thought it a region of sunshine and rest,
And they called it O'Brazil—the isle of the blest.

"From year unto year, on the ocean's blue rim,
The beautiful spectre showed lovely and dim;
The golden clouds curtained the deep where it lay,
And it looked like an Eden, away, far away!"

It was to find this Fortunate Isle, Brazil, that Bristol sent out expeditions in 1480 and later. It was in search of this island of happiness that John Cabot left Bristol in 1497, and he found the continent of America for England.

Great illusions always played an important part in the history of Mankind.

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The PRESIDENT (before the paper): I am sure it will be your desire that I should open these proceedings by offering the very heartiest welcome to our old

friend and distinguished guest, Dr. Nansen. He needs no introduction from me, It is not the first time, and I hope it will not be the last, that he has lectured on subjects that he has made all his own to a great English audience. Famous as a traveller, learned as a scholar, talented as a representative for some years of his country in this, endeared to those who know him as a man and as a friend, it is yet as a geographer that we know him best and value him most. And now he has once more come amongst us to place at our disposal the resources of his wide learning. He is going to-night, I understand, to endeavour to penetrate and to dispel some of those clouds of mystery that overhang the movements of the great navigators of his own race, who, in centuries long gone by, are believed to have made their way across the oceans to the mainland of America. I dare say he will upset some accepted versions of history in doing so; if so, so much the better. That is the object of geographers and of scholars. But of one thing I am certain—that, whatever the records he gives us of great and valiant exploration by Norsemen of the past, there will not be any one among them who will have reflected more credit upon the race from which he sprang than our distinguished guest has done himself. Without further ado, therefore, I will call upon Dr. Nansen to read his paper.

Sir CLEMENTS MARKHAM: We are all delighted to welcome our old friend Nansen here again, and I rejoice especially that he should have devoted his great talent to history, and produced so magnificent a work as that which I have just received. All day yesterday I was in the midst of the 'Mists of the Northern Sea'—instead of going to church: not lost, but under good guidance. Now, in this most interesting and important paper, he has brought to our notice the story of the discovery of America by Norsemen. For sixty years I have never had any doubt about that. When I was at the Whalefish islands, on the coast of Greenland, I and the present admiral, Sir Vesey Hamilton, wanted a boat to go and shoot ducks, and we could not get one. So we went to the transport and got the agent to let us have his great lumbering boat, a six-oared gig. It was a dead calm. We went away and had some sport, and then we had our luncheon, with a little alcoholic stimulant—which is an admirable thing in the Arctic regions, I think—and then went to sleep. When we awoke, we found there was a very strong breeze, the sea rising rapidly, and the islands a long way astern; we had a very long pull indeed, and I was quite exhausted and in despair—Hamilton was not. Ever since that, I have been convinced that, saga or no saga, there was plenty of proof that the Norsemen discovered America; we were going straight to America then. It was impossible for the Norsemen to have been several centuries in Greenland without discovering America. Our friend Nansen very properly laments that we have nothing contemporaneous—that we are obliged to go to those sagas which were written nearly three hundred years after the events. Well, that reminds me of what old Fuller says in his 'Worthies': "Let him die of thirst without pity who will not drink from the stream because he cannot get to the fountain." I am quite sure that Nansen, like myself, is satisfied with the intense interest and charm of the sagas. The great point in Nansen's paper is, of course, his separation of legend from history. He saw, as others have seen, I think, that Wineland the Good, the grapes and the self-sown wheatfields must be legendary at all events. But the amount of research and the amount of literary skill he has devoted to the discovery of the origin of these legends astonishes me. I have been to St. Isidore, who was an old Bishop of Seville in the time of the Gothic kings of Spain, once or twice, for other objects chiefly connected with etymology, but I should never have dreamt of going to St. Isidore to find out where Wineland was. Nothing seems to escape Nansen!

He has discovered a close resemblance between a description of the Fortunate islands by St. Isidore, and the description of Wineland by the writers of the sagas. I have thought over the matter very carefully, and I quite believe that the resemblance, as Nansen says, could not have been fortuitous, and that he has really hunted out the origin of that legend. There is no blame to be attached to the writers of the sagas. They were perfectly right in recording the stories as they were handed down to them. Now the question is how the legends reached Iceland. I believe it was through Svein Estridsson, that old King of Denmark, the nephew of our great King Canute, so that it was a very long time ago and long before that fourteenth century when the sagas were written. Now, King Svend was known to be a perfect encyclopædia of Arctic knowledge—knew everything—so, of course, the first thing Adam of Bremen did, when he wanted to get knowledge to write his history, was to go and pay a visit to this king, and the old king told him some very tall stories! He told him this story of Wineland. Of course, it is very interesting to hear about the legends of St. Brandan and the other Irish tales, and it is quite possible that the idea of Wineland may have come through them, but I think that old Svend was responsible. It is a great pleasure to find that I can agree on these points with my friend Nansen, and I am glad to be able to tell him that there are people in England, and a good many, I believe, at all events some that I know of, who will fully appreciate and understand his arguments and his history. They are men of a younger generation than ours; they are actually studying with great care the history of the Norsemen in Greenland. I may mention Mr. Basil Soulsby, the translator of the work of Fischer, and I may mention Mr. Gathorne Hardy, who has learnt Dutch and Norse in order to be able to study these works. In conclusion, I must congratulate my friend Nansen on having produced the finest work on early Arctic history that has ever appeared. Nansen is a great explorer, and he is also a great historian.

Mr. G. M. Gathorne Hardy: It is quite true that I have taken a great interest, though I am afraid as yet in rather a superficial way, in the question which has formed the subject of Dr. Nansen's interesting paper to-night, but I feel great diffidence in saying anything on a matter which has been treated by such a great authority as Dr. Nansen, and treated so entertainingly as it has been by Sir Clements Markham, and I think at this stage of the evening I will not trouble you with much of what I should like to have said on another occasion. There is one point I should like to make before I sit down. Dr. Nansen laid great stress on the question of the wine and the corn as showing the legendary origin of the greater part of the sagas. It has struck me as a remarkable fact that when you come to the time of the authentic exploration of those same regions to which most of us attribute the voyages of Karlsefni and of Leif, you have the same mention of vines and of wild corn. In the accounts which Jacques Cartier gave of his explorations in those latitudes one finds such passages as these: "There is no place, be it never so little, but it hath some trees (yea, although it be sandie), or else is full of wilde corne that hath an eare like unto Rie: the corne is like oates, and small peasen as thicke as if they had been sowen and plowed," and "where on both shores of it we began to see as goodly a country as can with eye be seene, all replenished with very goodly trees, and vines laden as full of grapes as could be all along the river."

I do not want to dwell on it to-night at this late hour, but it seems to me that it is an extraordinary coincidence, if these sagas have mainly the legendary origin which Dr. Nansen ascribes to them, that they should hit off the actual facts of the country to which they have been mainly attributed. The fauna

there is never a mistake about; and the same may be said about the description of the coast: no one who has been along Labrador can fail to recall, as he passes those ice-ground, weedless rocks, the description and condemnation of Helluland, "the flat-stone land destitute of all good qualities," and so on down the coast, so much so that audacious people have gone so far as to try to identify each particular place; and even if they were wrong, I think we must admit that with this circumstantial account given in the sagas, the endeavour was very tempting.

The PRESIDENT (after the paper): I do not know if we have any other speaker who is prepared to entertain us on this rather abstruse subject. I wish that Mr. Gathorne Hardy had developed his views. It was quite clear, from the few remarks he made, that he is a student of the subject, that he has grappled with it at first hand, and has opinions of his own. I feel much diffidence in dealing with a matter which I have not previously studied. I was greatly impressed, of course, by the authority of Dr. Nansen, by his profound learning, by the manner in which he marshalled his evidence, but, if I may say so, I was not wholly convinced. Dr. Nansen, I think, made out a very strong case for showing that the legendary account of the Fortunate Isles, or the Happy Isles, or whatever you please to call them, has prevailed throughout the world from classical days through the Middle Ages, down almost to modern times. There are certain common features of character, of landscape, and of vegetation which are familiar in all those accounts. Let that be granted; let us grant, again, that these stories may very well have made their way up to Iceland, and may have made their appearance in the sagas there. But, on the other hand, you have a very definite body of historical tradition and belief. You have had it quite clearly established that these Norsemen did make their way to Markland, to Helluland, to the Marvel-strands. Dr. Nansen himself concedes that. He admits that these were authentic voyages; that they described actual countries; that the features of those countries can be identified. But having carried us so far, he rejects Wineland, and he does so for two reasons. Firstly, because the features which are described in the Wineland of these travellers are not identically found upon the American continent; and, secondly, because they are found in the mythical legendary accounts of the Happy Isles of earlier legend. My experience of travellers and of the literature of travellers is, that as time goes on more travellers are found to have told the truth, and fewer travellers are proved to be liars. That is perhaps not a universally accepted belief. But look at the history of travel. You have Herodotus, formerly described as the parent of untruth, now accepted as the greatest and on the whole the most accurate authority on points of history and geography of the ancient world. You have Marco Polo, absolutely discredited in his day, now the foremost mediæval authority about the Far East. The only man, I believe, whose reputation has never been successfully re-established was Sir John Mandeville, who, I am afraid, was to a large extent an impostor. And most of the living travellers with whom I have been brought into personal contact are men of scrupulous honour, who always tell the truth. I am rather inclined to believe that Leif was the Lucky; that he did not only reach Markland and Helluland and Marvel-strands, but that he did get to Wineland, and that it was somewhere on the coast of America. Now I am getting, I know, into very dangerous waters, because I see my friend Nansen sitting here on the left, with all his stores of learning bubbling within him, prepared no doubt to demolish my ignorant theories. At the same time I should like to suggest to this audience, with all respect to his great knowledge and with all the gratitude we feel to him, that we do not regard the point as being absolutely

settled. Let us keep somewhere in our minds a lingering belief that Leif may, after all, have done what he is said to have done; anyhow, if ever we have the opportunity, let us pursue the studies which have been opened to us to-night. I have not made these few remarks with the idea of provoking a controversy, but merely of indicating that the subject is one which deserves very close scrutiny. The only thing remaining for me now is to express what I am sure are the sentiments of all of us present, in giving the heartiest vote of thanks to Dr. Nansen.

Dr. NANSEN: First of all, I wish to express my deep gratitude for the manner in which you have received my paper, dealing with a rather heavy subject, which is, I am afraid, difficult to make interesting to a great audience. I beg to thank especially the President and my old friend, Sir Clements Markham, and Mr. Gathorne Hardy, for the much too kind words with which they have mentioned me and my investigations.

In addition to what I have already said in my paper, I wish to mention a rather important fact, which will, I believe, be of great interest to Sir Clements, as it may throw some light upon what he said about King Svein Estridsson of Denmark. In the Icelandic literature it is stated that the Icelandic chief, Gellir Thorkelsson, grandfather of the well-known Icelandic author, Are Frode, died at Roskilde, in Denmark, in 1073, after having been prostrated there for a long time. He was then on his way home from a pilgrimage to Rome. Adam's book was written between 1072 and 1075, and he had received his statements about Wineland from King Svein and from Danes of rank. The coincidence here is so remarkable that there must probably be some connection. And this Gellir may therefore be the real source of Adam's knowledge of Wineland. Thus we are led to Iceland, and thence the tale may have come from Ireland. It is also interesting that Gellir's son, Thorkel Gellisson, was the great authority of Are Frode.

With regard to Mr. Gathorne Hardy's remarks, first of all I wish to draw his attention to the fact that according to my view the Norsemen have actually been in North America, and I also believe that there are features in the saga which probably prove at least some connection with the countries described; I think that the descriptions of Helluland, and especially Markland, perhaps the most genuine of all these countries, may show some knowledge of these regions. The saga of the Wineland voyages may thus, as many of those other Icelandic sagas which we know for certain are fictitious, have been based on some knowledge of the countries described. I may mention as an example the saga of Torgils Orrabeinfostre's journey along the east coast of Greenland. There can be no doubt that this saga is more or less fictitious; but, on the other hand, it shows evidently knowledge of the East Greenland coast. I think it may be in the same way with the descriptions of the voyages to Wineland. Mr. Hardy mentioned that in a description of America after its rediscovery, vine and wild-growing corn are also mentioned. This is true; we know several such descriptions, but in none of them is wheat mentioned; the corn found is said to have resemblance to oats or rye, etc. It has, however, to be remembered that such features are quite common in descriptions of new-discovered countries. When John Cabot came back after having discovered what I think was Nova Scotia, he said that there was reason to believe that silk and brazil, the precious dye-wood, were growing there; these were the two most valuable commercial products at that time, just like wine and wheat. The discoverers very often found that which they considered specially valuable, or at least things resembling it.

As to Lord Curzon's remarks, I may say that there is here no question of anybody being a liar. We have a story that was put into writing some two

or three hundred years after the events recorded are said to have occurred. It has been transmitted by word of mouth from one man to another, but such stories assimilate continually new elements, and grow, as we know, very often in much shorter time than three hundred years. We need not go very far to find first-hand stories which are not quite trustworthy. We have no authentic account of any voyage to Wineland; we must expect the sagas about these voyages to contain legendary features. The question is, not whether the author of the saga or the travellers were liars, but to find out how much of the saga is legendary, and how much may show real knowledge of the Western lands. As I have said, I think there is some core of truth in the saga, in so far that lands to the West actually were found. But it may be very doubtful whether the voyages to those countries were undertaken by the men mentioned in the saga, for it is very strange that the voyages of these men are not mentioned in the early sources.

Sir CLEMENTS MARKHAM: What do you think of that baby Snorre that was born there?

Dr. NANSEN: Well, Snorre was the son of Thorfinn Karlsevne. Hank Erlendsson, the author of the Handsbók, descended from Thorfinn Karlsevne, and was therefore naturally anxious to make him discoverer of Wineland. I wish once more to thank you most heartily for the welcome you have given me

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## A FORGOTTEN NAVIGATOR: CAPTAIN (AFTERWARDS SIR) JOHN HAYES, AND HIS VOYAGE OF 1793.

By IDA LEE.

IN the year 1793, John Hayes, a young lieutenant in the Bombay Marine, was granted long leave of absence by the Indian Government, which was probably aware that it was his intention to undertake an expedition to Southern waters. He had recently learned from John McCluer, a brother officer, that the nutmeg and other valuable spices were to be found growing plentifully on the western coasts of New Guinea, and he determined to voyage there to bring back a cargo of these products for the Indian market.

Some Calcutta merchants joined Hayes in the speculation and provided two ships to enable him to carry out his scheme. The *Duke of Clarence*, 250 tons, mounting 14 guns, and the *Duchess*, an armed snow of 100 tons, were made ready for sea early in January, 1793, and sailed from Calcutta on February 6, Hayes taking command of the larger ship, while the *Duchess* was given in charge of William Relph, also of the Bombay Marine.

In one of his letters describing his departure Hayes writes: "We left the pilot on February 9, intending to sail for the west coast of New Guinea. Our ships' courses were set to Timor, and here, on March 15, between Holland and that island I came off the parallel of the track I meant to pursue." On falling in with the south-east trade wind sooner than was expected in these waters, Hayes found it expedient to hold a consultation with his officers. Their deliberations resulted in a complete change of plan, and it was decided to voyage first to Tasmania, and afterwards to steer in an

easterly direction until they met with the south-east trade wind in the Pacific, which would allow them to range any part of New Guinea.

The vessels arrived off the Mewstone rock on April 24, and attempted to enter Adventure bay, but neither could beat into it, so they passed round Cape Frederick Henry and came to in Storm bay, afterwards proceeding to a small inlet to the north-east, to which was given the name of Speak's bay.

CAPTAIN (AFTERWARDS COMMODORE SIR) JOHN HAYES.

*(Portrait by Opie, now in the possession of Lieut.-Colonel Crawford, I.M.S.)*

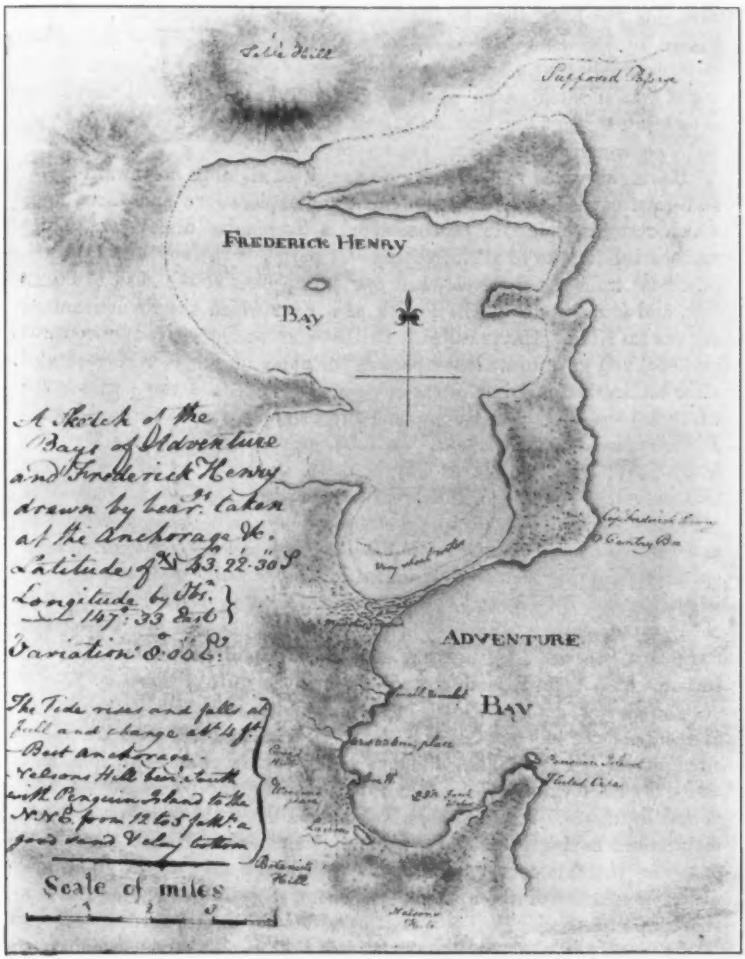
When Hayes landed on the 25th, he was unaware that only two months previously the French Admiral, D'Entrecasteaux, had sailed from Adventure bay, this being the second time his ships had visited Tasmania. D'Entrecasteaux had first arrived there in April of the previous year, and, entering Storm bay, had discovered a channel which he named after himself. Besides thoroughly exploring it his boats had entered two rivers, naming them Huon and Rivière du Nord. The French in fact, before the arrival of Hayes, had made many surveys of the Tasmanian coast and had

given French names to almost every part of its southern shores. On the occasion of his first visit D'Entrecasteaux stayed a month and then sailed to New Caledonia, but, as mentioned above, he returned a second time to Tasmania in 1793. Hayes does not seem to have suspected the recent presence of the French, nor does he appear to have known that parties from Bligh's ships—the *Providence* and the *Assistant*—had surveyed Bruni island a few months before D'Entrecasteaux had reached Tasmania.

From the absence of any published narrative of this second voyage of Bligh, little has been known generally as to the precise amount of work achieved. But the manuscript records in existence show that, while Hayes was mistaken in regarding himself as the first discoverer of this part of the Tasmanian coast, it is equally a mistake to suppose, as is so often done, that the French navigator found the interior waters examined by him virgin ground when he began his work in the same region. The manuscript chart of Lieutenant Bond, of H.M.S. *Providence*, which we reproduce, is the first map to show Table Hill (now Mount Wellington), or any part of the strait, the outlet and entrance of which were yet to be discovered by D'Entrecasteaux. Bond called one of the harbours within it Frederick Henry bay, which, of course, it was not, and he writes in his log: "The entrance of Frederick Henry bay is not positively known, but is supposed to be where represented in the chart," and he also states that he obtained the information which his chart contains "partly from ocular knowledge and likewise from those who pursued different routes from myself." The fact that Bond erroneously called this bay Frederick Henry bay does not detract from the discovery which he has recorded, for all the seamen who first visited these waters were uncertain as to the situation of Frederick Henry bay. Marion and Furneaux gave the title to other bays, alike failing to identify it, and as a result the name of the Dutch prince of the seventeenth century, introduced into Tasmania by Tasman, has drifted, like flotsam and jetsam, to rest finally on a bend of the coast which it seems physically impossible for Tasman to have seen.

While his crews were seeking wood and water, Hayes began his examination of the coast. His attention was first directed to Bruni island; in due course he found that it was separated from the mainland, and named it William Pitt's Isle in honour of the Prime Minister. He then took his ships into D'Entrecasteaux strait through its northern entrance, passing in by the opening from which the French admiral had twice taken his exit. He proceeded to give English titles to all the places lately named by the French, selecting them principally in honour of the officials of the East India Company. D'Entrecasteaux strait was renamed by him Seton strait after Mr. Daniel Seton, a senior merchant of the company, and as he proceeded down it, examining its indentations, he called the west side, which was mainland coast, New Cumberland. His ships anchored in William Fairlie's harbour (Port du Nord Ouest of D'Entrecasteaux), in Port McCluer, named in remembrance of John McCluer, and in Port Pruen, where fresh water was obtained.

In surveying D'Entrecasteaux strait Hayes seems to have overlooked two harbours, La Petite Anse of D'Entrecasteaux, and the great opening that forms the mouth of the river Huon. The Isthmus bay of D'Entre-




BAYS ON THE SOUTH-EAST COAST OF TASMANIA, FROM LIEUT. BOND'S LOG.

casteaux was named by him Henry Hall's harbour, and Esperance bay, Adamson's harbour. The inscription Admiral "D'Antrecastaux" bay which occurs in his chart, evidently was added to it after his return to

India, as his letters show us that he knew nothing of the French discoveries, but considered his own work to have been of that character. He writes to Lord Cornwallis: "I have discovered a strait abounding with many fine harbours . . . the large island that forms the strait I discovered has on its east side the bay called by Captain Furneaux Adventure bay, and was visited by Captains Cook and Clerke. Although these three navigators were expressly sent on discovery, they left Adventure bay without knowing it was situated on an island. Cook and Furneaux assert that there is no strait through Van Diemen's Land, but that it is part of New Holland, but I am convinced that there are several."

Having surveyed the strait Hayes navigated his ships northward again, and then carried out his most important explorations and those upon which rest his claims to be considered a Tasmanian discoverer. Three months before, two of D'Entrecasteaux's party, Willaumez and Beaupré, in a boat from the *Recherche*, had seen an opening at the head of Storm bay, and found it to be the mouth of a river which the French named Rivière du Nord. Hayes called it the Derwent or Derwentwater towards its head, and gave to its lower portion the name of Fletcher Hayes's gulf after his brother, a writer in the company's service. In this part a beautiful cove was christened Risdon, and two mountains overlooking it Mount Direction and Lion Couchant. In following the course of the Derwent from Mount Direction Hayes may be called a discoverer, as it was from that point that the boat of D'Entrecasteaux had turned back, and no white man had ever attempted to penetrate beyond it. Many in Australia and Tasmania have wondered why Risdon was so called. It has often been stated in print that the name originated in "Restdown," as being the place where the first British settlers under Lieutenant Bowen, R.N., rested after their stormy voyage from New South Wales in 1803, and this legend has come to be regarded by many as the truth. Risdon, however, was the surname of William Risdon, second officer of the *Duke of Clarence*.

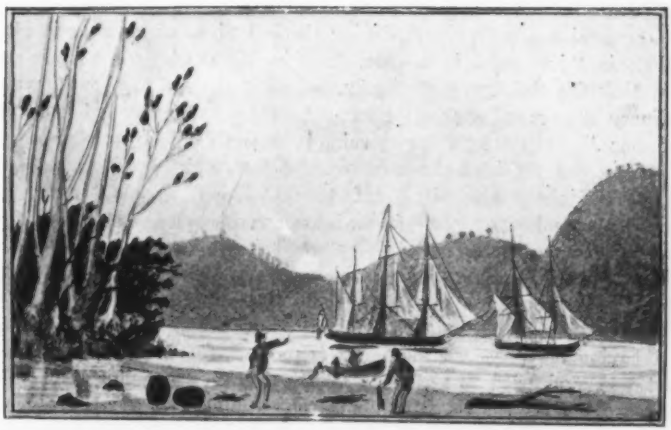
The chart which Hayes made of Tasmania afterwards fell into the hands of Lieutenant Flinders, of H.M.S. *Reliance*, who, in 1798, with Dr. Bass, circumnavigated Tasmania. Flinders took Hayes's chart with him, and added to his own chart of the latest discoveries the places visited and named by Hayes. He and Bass also altered some of the terms on Hayes's map, coves having been called bays in it and creeks rivers. The fact, however, that Flinders gives the name of Hayes's ship as the *Duke* and makes no mention of a companion ship, shows that, beyond having Hayes's chart in his possession, he knew little or nothing of the voyage.

Our copy (see p. 587) is reproduced from one in the Admiralty Library, which is inscribed to Sir John Shore, Bart., by his most faithful servant John Hayes. It differs somewhat from a chart of these shores made by Beautemps-Beaupré, although perhaps the difference lies mainly in the manner of its delineation.

There is also in existence an engraved chart "with the newly discovered

river . . . from John Hayes, 1798." Inset in this outline of Tasmania's southern shores is a smaller chart which shows the anchorage of Hayes's ships and the Derwent's course on a larger scale. This chart was designed either by Matthew Flinders or Alexander Dalrymple. Admiralty papers at the Record Office show that Dalrymple made a sketch of similar character, which was engraved in London by Messrs. Laurie and Whittle in 1798.

Hayes left Tasmania on June 9, 1793, and steered the course taken by the French admiral on his first voyage from Tasmania in 1792. The French ships had made the Isle of Pines twelve months before he reached it. From this point D'Entrecasteaux had worked to the northern extremity of New Caledonia, examining the western coast and standing in with



BLIGH'S SHIPS, THE *PROVIDENCE* AND *ASSISTANT*, IN ADVENTURE BAY.
(*Sketch by Lieut. Tobin.*)

both ships close to the barrier reef; but though he saw an opening in this, he would not allow his boats to examine it, owing to the heavy sea, and was content to bestow on the harbour within the name of Le Havre Trompeur.

Hayes reached the same land on June 28, 1793, and on approaching it fell in with the south-east trade, as he anticipated. He tells us: "I arrived at New Caledonia on June 28, and ranged the whole south-west coast and explored it to the satisfaction, I hope, of all mankind," and he continues: "It was before entirely unknown. The north-east side was explored by Captain James Cook, but at too great a distance in most places to give any idea of the dangers along the shore. I only found two anchoring-places on the south-west side, and those were indifferent ones, the last

being near the west end." At this anchorage Hayes saw something of the natives, and writes of them:—

"I brought three canoes alongside with four men in each; they were fishing on the reefs, and were so awestruck at the sight of the ships and the white men that they could not move and were brought in tow by our boat in a state of stupor. I got several on board and made them presents, but they did not like their situation, making signs that they ate those they took and were afraid that we were going to eat them. . . . Our salt meat they ate, but made signs that it was made out of our enemies. . . . The road where we lay I called Directors' Road in honour of the Honourable Company. It lies in latitude 20° 43′ 20″ S. and 163° 41′ 20″ longitude East of Greenwich." The bay which Hayes entered on this occasion would seem to have been what is now known as Gomen bay, lying inside the Great Mathieu reef.

Hayes also describes how, during the last night of his stay in New Caledonia, "just opposite to where the ships lay at anchor a large mountain took fire and burned furiously, agitating the sea in a most extraordinary manner and causing the waves to recede to a great distance from the shore." On the following morning innumerable black rocks appeared above the water which had not been seen before, and this determined him to quit the inhospitable island. He thought New Caledonia "one of the most dreary and barren places in the known world, as is the shore the most dangerous, a reef facing its whole extent, being in some places 6 leagues distant from the mainland, over which the sea breaks continuously and furiously."

Leaving New Caledonia on July 3, Hayes sailed to the Louisiades, and having made the southernmost islands of the archipelago, turned westward, and tried to pass between them and the mainland of New Guinea. But the islands and reefs presented difficulties which compelled him to alter his course again. He states that before he turned back he discovered where the coastline of New Guinea ended, and that he saw three woody islands at its south-eastern extremity, which may have been Hayter, Basilisk, and Moresby islands. Hayes then doubled back to Rossel island, and, rounding Cape Deliverance, anchored off the island's eastern shores, probably in Pwennegua harbour. In a letter to an Indian newspaper, describing his visit, he writes of Cape Deliverance as "the southern extreme of a high mountainous island," which he called "Bougainville's island," after its first discoverer. D'Entrecasteaux had sighted it, and it was named Rossel island by the French. Hayes, however, was himself the first European to land there, and he relates that he was able to observe the inhabitants, and came to the conclusion that they were divided into two different races. Some of the shore natives showed signs of hostility as the ships lay at anchor, but disappeared when a cannon was fired over their heads. On the following day the beach was found to be strewn with boughs of cocoanut trees, which it was supposed were

NEW
YORK
SHIRE
CUMBERLAND
NEW
High Mountains
Port Dalrymple
Tamar River
Port Sorell
Macquarie Harbour
Storm Bay
Frederick Henry Bay
Norfolk Bay
Tasman Peninsula
Port Arthur
Maria Island
Oyster Bay
Great Swanport
Ben Lomond
Ben Nevis
Hobart Town
Derwent River
Port Esperance
Huon River
Cape Pillar
Tasman's Peninsula
Cape Frederick Henry
Cape Pillar
Cape Hauy
Tasman's Head
Eaglehawk Neck
Pirates Bay
Adventure Bay
Bruny Island
D'Entrecasteaux Channel
Recherche Bay
South West Cape
Port Davey
Bathurst Harbour
Mount Direction
Lake Crescent
Hayes Creek and River
Long Reef
Deep Water
Fort Dundas
Port Cygnet
Port Esperance
Port Frederick
Port Huon
Port Esperance
Port Esperance
Port Esperance

placed there as "marks of submission." Parties on going ashore from the ships found that the houses resembled those of the Malays and of other islanders to the eastward, and some were decorated with skulls which hung in festoons around the walls and doors of the dwellings. The remains of feasts seen by Hayes proved these people to be cannibals. Continuing his voyage, and steering along the northern shores of the Louisiades, his ships anchored at an island in latitude 10° 40′ S. and longitude 154° 20′ 20″ E. of Greenwich. This was evidently Misima,* the Island Saint Aignan of D'Entrecasteaux, which differs from the other islands in these waters in having no encircling reef, but is surrounded by steep rocks behind which rise very high mountains. Hayes tried to communicate with the natives, but without success. Once some of his people were nearly cut off from their ships by the savages, and the commander also describes them "as horrible cannibals proving themselves worse than those mentioned by Captain Cook in New Zealand."

At this point of his voyage Hayes seems to have gained on D'Entrecasteaux, for only on June 11, the French ships (on their second voyage from Tasmania) had seen Rossel island. On arriving at New Guinea Hayes stood in towards its south-eastern extremity, intending to range the whole of the northern coast, but light winds and strong currents compelled him to steer through St. George's channel and round New Britain. He then sailed southwards, passing through an archipelago, which he named Cornwallis archipelago. After this he returned to finish his exploration of New Guinea, and, crossing Geelvink bay, entered a large harbour. Shortly before he reached it an epidemic had attacked the crews of both ships and many had succumbed. Indeed, all were in so sickly a state on their arrival on September 18, that only two of the hands on the *Duke of Clarence* were fit to go aloft. He now found himself at a spot where a temperate climate, and an abundant supply of native vegetables, including lemon grass and scurvy grass, together with various fruits, soon restored his ailing men to health, and, unaware that it was already known to Europeans as Dorey harbour, Hayes named it Restoration bay.

The information that McCluer had supplied was found to be correct. The nutmeg, as well as other valuable spices, grew there in profusion. The sailors began to build a fort, which, with the help of natives, was completed on October 25, the anniversary of the coronation of King George III. It was accordingly named Coronation Fort, the British flag was hoisted, and a royal salute of twenty-one guns fired, Captain Hayes thus taking formal possession of the country, which he called New Albion.

So confident was Hayes of the final success of his operations that he decided to return to Calcutta and to tell the news of his discovery to his

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* H.M.S. *Renard*, in October, 1879, anchored here in a small bight on the east side of a large bay, which probably was the spot where Hayes anchored in 1793.

partners there. He did not sail, however, until he had superintended the removal of a number of nutmeg trees from the forests to plantations which had been prepared in the neighbourhood of the bay. He left Captain Court and sailors selected from both crews to take charge of the fort and of the *Duchess* during his absence, and, following a route which took him to the Moluccas and Timor, proceeded to Java by way of the Straits of Madura.

At Surabaya he saw D'Entrecasteaux's ships—the *Recherche* and the *Espérance*. They were in the hands of the Dutch. D'Entrecasteaux was dead, having been first taken ill in the preceding July.

Being induced to call at Batavia, Hayes fell in with Commodore Mitchell's squadron, and, as France and England were then at war, found himself under orders from the Commodore to proceed to Canton. Captain Relph, however, who was with him in the *Duke of Clarence*, remained behind and obtained a passage direct to India in an East India Company's ship. Hayes entrusted him with despatches for his co-adventurers and others for the Directors of the East India Company, praying that they would further the objects of the discovery and extend their protection to the infant colony. A similar petition from the merchant owners themselves was also sent to the Company.

The replies to these requests were unfavourable. Examining the charts of Hayes's voyage to New Guinea, the Company compared them with those made by Captain Thomas Forrest when he visited that country in the *Tartar* galley in 1774–5, and found that the observations of Hayes, so far as New Guinea was concerned, were identical with those made by Forrest, and that the New Albion Restoration harbour and Princess Royal harbour of Captain Hayes proved to be the New Guinea Dorey harbour and Mansingham harbour of Forrest. For this reason the directors declared that they could not deem themselves justified in granting the petitions sent in to them.

The journal of the voyage, in which were included twenty-two charts, was never published, although on his return to Calcutta, Captain Hayes solicited the assistance of the East India Company to enable him to meet the cost of printing it. In replying to him the Company offered to become subscribers only to the extent of thirty copies, and it is possible that the insufficiency of the support upon which he could reckon for certain was the reason why the record of his adventures never saw the light.

In spite of what appears to have been a great lack of appreciation by the outside world of what Hayes accomplished, he cannot be passed over when the history of Tasmania is told, and although his name is never mentioned in connection with the discovery of New Caledonia, he evidently was the first to enter the openings in the reef and to anchor off the western coast.

The French have awarded to D'Entrecasteaux a place of great honour among their navigators, and it is not too much to claim a niche among

our English seamen for one who so skilfully, if all unconsciously, often followed in his track, and at some points pressed onwards where the French admiral had drawn back.

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## MR. BINGHAM IN VILCAPAMPA.

By Sir CLEMENTS R. MARKHAM, K.C.B., F.R.S.

Mr. Bingham, of the Yale Peruvian Expedition, has been exploring the little-known mountainous district of Vilcapampa to the north-west of Cuzco, and has made some important discoveries of Inca ruins.

Vilcapampa is a mountainous region to the north-west of Cuzco, between the rivers Apurimac and Vilca-mayu (or Urubamba), with its northern slopes subsiding into the great Amazonian plain. The water-parting is nearer the Apurimac, so that the streams flowing to the Vilca-mayu have longer courses than those descending to the Apurimac. Vilcapampa is a region of peculiar interest, because it was here that the Incas maintained their independence for thirty-five years after the rest of Peru had been overrun by the Spaniards. It was known that a palace, temple, and convent of virgins were erected in imitation of the splendid edifices at Cuzco. But a scientific survey of this interesting district, and an examination of any ruins that might exist, have long been important desiderata.

Mr. Hiram Bingham, of Yale University, who in 1909 had explored the extensive but little-known ruins of Choquequerau on the Apurimac, has now sent home a brief account of the work he has achieved in Vilcapampa.

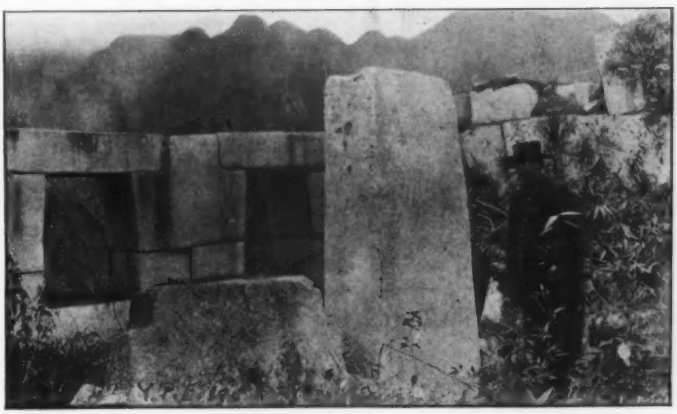
About 8 miles below Ollantay-tambo on the Vilca-mayu, at the narrowest part of the river, Mr. Bingham found a small fortress with five salient and re-entering angles. This is the locality where there was a bridge called Chuqui-Chaca in the Inca times, by which Spanish envoys were twice allowed to enter Vilcapampa. It is described by the envoy Figueroa and by Ocampo.

Lower down the valley Mr. Bingham came to a footbridge of logs just under the heights of Macchu-pichu. Going up the steep ascent, he came to some grass huts inhabited by three Indian families cultivating maize, potatoes, and beans. They had cleared away thickets and disclosed megalithic ruins and remains of later houses.

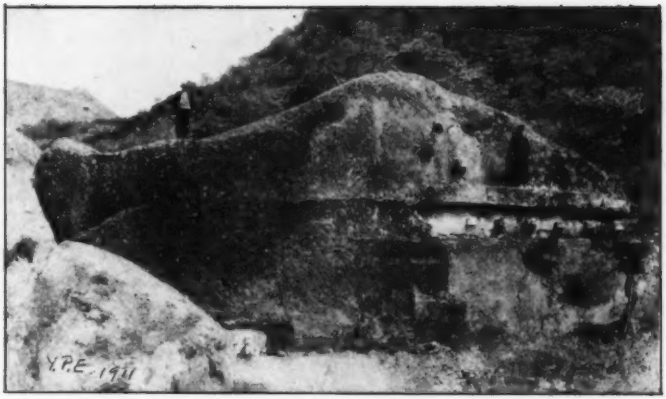
At the narrowest part of the ridge of Macchu-pichu there was a group of Inca edifices, built with large stones beautifully worked, 13 by 4 feet, 10 by 8, and one 14 feet long. One of the walls contained three windows of unusual size.

Mr. Bingham then went further down the valley of the Vilca-mayu to the well-known town and port of Santa Ana, and thence ascended the river of Vilcapampa on foot as far as Lucma, where he found more ruins, and some more at a place called Rosas-pata. In a dark valley at the back of Rosas-pata a colossal monolith was discovered, 180 feet in circumference,

INCA WALL AT MACCHU-PICHU.



INCA WALL AT MACCHU-PICHU WITH WINDOWS.




MONOLITH CALLED NUSTA.

INCA POTTERY AT CONSERVIDAYO.

25 high and 27 broad. This is another piece of evidence of the extent of the megalithic empire. The monolith is now called Nusta España. On a bank of the Vilca-mayu there is another stone of megalithic times, carved with seats, niches, and channels.

Mr. Bingham followed a river called the Pampaconas for some days on foot, and found more ruins and ancient pottery at a place called Conservidayo.

This is the pith of the present instalment of information received from Mr. Bingham. I trust that it is the forerunner of a fuller topographical description of Vilcapampa and of its ruins. There seems to be evidence that a more well-established court and government, with stone edifices of good Inca architecture, existed there during the thirty-five years' Inca rule (1536 to 1571) than has hitherto been supposed.

The identification of names will be a work of time. On the latest map I have, there are twelve names in Vilcapampa. Bingham gives eight, of which only one is the same (Lucuma). The Spaniards Ocampo and Figuroa, in about 1570, give fourteen—

| Latest map. | Bingham. | Ocampo and Figueroa, 1570. |
|---|---|---|
| 1. Pintobamba | Iquente | Viticos (vitcos) |
| 2. Lunascoyoc | Mandor-Pampa | Chuqui-Chaca (bridge) |
| 3. Potrero (Sp.) | Macchu-Pichu | Pilcones (savage tribe to north) |
| 4. Chillan | Rosas-Pata | Simaponte |
| 5. Soraspata | Nusta-España | Mañaries (tribe to north) |
| 6. Lucuma | Lucuma | Hoyara |
| 7. Paltaibamba | Pampaconas (river) | Huamani |
| 8. Vilcabamba | Conservidayo | Huamanape } (silver mines) |
| 9. Pallachayoc | | Villa Rica de Argeta |
| 10. Yahuarmaqui | | Vilcapampa (San Francisco de) |
| 11. Rayanpata | | Purumata |
| 12. Huaranceique | | Hondara Amaipampa |

The comparative lists will enable inquirers to follow the gradual acquisition of knowledge respecting this most interesting region. It is one of the almost innumerable tracts of country over the Earth's surface which are practically unknown to geographers.

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## MESSRS. C. A. AND A. E. H. REID'S SURVEYS IN THE NORTHERN CONGO BASIN.*

In the *Journal* for July last we published a map of the Aruwimi river from the surveys of Mr. Robert L. Reid, who in the midst of other duties had made full use of the opportunities offered of improving the map of this

* Map, p. 648.

still imperfectly surveyed part of the Congo basin. A similar service has been done by Messrs. Charles A. and A. E. H. Reid, brothers of the above, for an adjoining part of that basin, during extensive journeys between the Aruwimi and the Welle carried out on behalf of the Société Internationale Forestière et Minière du Congo; and the results are embodied in the map which accompanies the present number. During the earlier journeys, while carrying out careful route surveys, which permitted them to map the general topography of the region traversed, the brothers were not provided with instruments for the determination of position, and they therefore adjusted their work to the positions along the Welle fixed by Captain Lemaire during his expedition for the determination of the north-eastern frontier of the Congo State. But during a visit to this country last year Mr. C. A. Reid went through a course of instruction at the Society, becoming sufficiently proficient in the use of the theodolite for astronomical observations to enable him, after returning to Africa, to obtain a number of trustworthy positions to serve as the basis of his map. As a starting-point for the longitudes—the differences of which were determined by the transport of time from one point to another—he has taken Captain Lemaire's position of Ibembo on the Itimbiri river, in the south-west, while on the south-east his work has been adjusted to Mr. R. L. Reid's map of the Aruwimi. Besides the observations used for the positions detailed on the map itself, we understand that Mr. Reid has secured a number of others, especially during a circular trip from Bambili to the French frontier and back, completed in February of this year. We may therefore hope to receive from him further contributions to the mapping of this part of Africa. In one of his letters he speaks of having seen what he takes to be an unknown species of antelope, jet black in colour, and of about the size and shape (including the horns) of a bush-buck.

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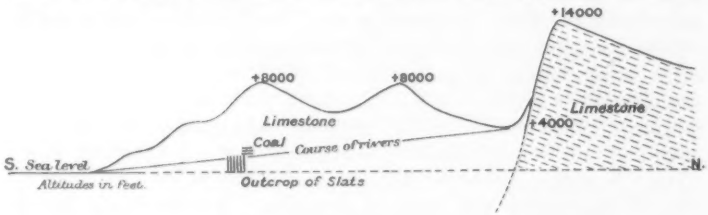
## DUTCH NEW GUINEA: CENTRAL RANGE.

With respect to the central range of mountains of Dutch New Guinea, referred to in the September number of the *Journal*, the following additional information has been received from Captain Rawling, who at the same time takes the opportunity of recording his thanks to Mr. A. F. R. Wollaston for the loan of half the photographs which were used to illustrate the lecture.

The Nassau range is a mountain block having a general direction from east to west, and a total length of about 100 miles, and is only a portion of the great chain which stretches from end to end of the island. The drainage between the northern and southern drainage systems is formed by the southern portion of this range, which has never yet been crossed, but which contains peaks approximating to 16,000 feet in height.

I assume that the recent uplift of this range is due to a recent fault, on

the ground of its persistence in a straight course, that the face of the great precipice is almost perpendicular, and that, despite the heavy rainfall, it shows little evidence of weathering. It is composed entirely, as far as we could tell from distant observation, of limestone, and is presumably of the same age as the limestone of that section visited by Dr. Lorentz 150 miles to the east, and in the Orange range. It shows distinct stratification, which, at every visible point, dips at a uniform slope of 25 degrees to the north. Nevertheless, in the southern part of the system of ridges which separate the south-flowing streams, slate, clay, and some small boulders of granite are to be found in the valley and bed of the Iwaka river at a point 19 miles south of the precipice and 6 miles to the north of Tipua camp. The slates seen were dipping vertically. Near this camp several seams of soft and crumbling coal were discovered, varying in thickness of from 4 to 8 inches. Close to the coal were many patches of dead forest killed by kerosine oil oozing from the soil. These rocks were visible only near or in the beds of the streams; their relation to the strata of the neighbouring mountains and of the precipice are not known. The strata of the hills to the south of the central range appear to lie at all




angles, and are chiefly composed of limestone which resembles that of the main range.

That the land between the mountains and the sea to the south is sinking may be implied by reason of there being no ground, except at one point on the Kaparé river, throughout the 40 miles which reaches an altitude of 100 feet; that no outcrops of rock are visible in any of the river-beds south of the mountains; that what now lies above sea-level is swamp and alluvial soil; and that portions of the coast are subsiding, as proved by acres of dead trees now standing in the sea at high tide.

As the dip of the strata of the main range is to the north, and as no higher peaks can be seen beyond, it may, for the present, be assumed that the crest of the precipice is the main water-parting between north and south Dutch New Guinea, and this assumption is strengthened by the fact that only small cascades of water enter the rivers flowing from the foot of the precipice. At Mount Leonard Darwin the shear vertical height is not far short of 10,000 feet, and other portions lying between that peak and Mount Carstensz will be found to nearly rival this in vertical height. Westward of Mount Leonard Darwin the precipice dwindles, until at E.

long. 136° 15′ it stands at about 4000 feet. At every few miles along the precipice great fissures are to be seen running back at an acute angle to the face, but apparently as impregnable to the climber as any portion of the front. The section holding out most prospect of success to the mountaineer lies to the west of Carstensz and between that mountain and Mount Idenburg. Here the difficulties are immense, but not unsurmountable. The glaciers of Mount Carstensz terminate at the crest of a cliff, over which the snow and ice pour into the ravine below.

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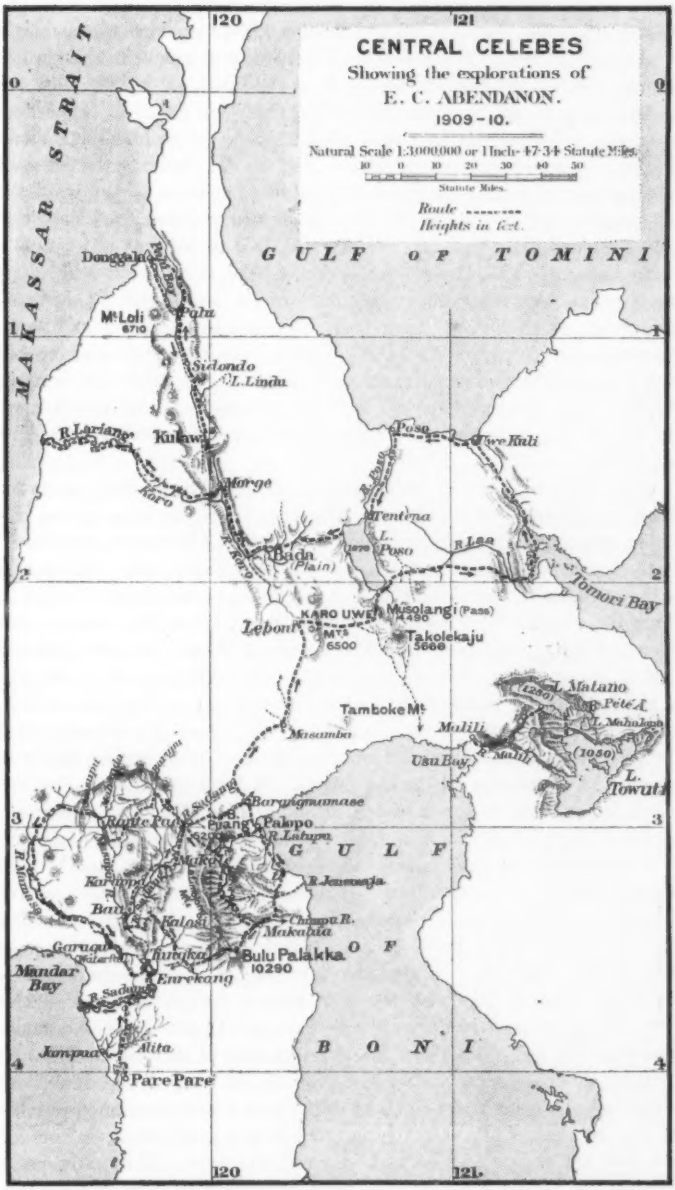
## CENTRAL CELEBES.

In the years 1909 and 1910 Mining Engineer E. C. Abendanon explored a considerable area in Central Celebes. His journeys extended across the base of the southern peninsula, from the head of the Gulf of Boni to the Makassar strait, eastwards to the lake basin at the base of the south-eastern peninsula, and northwards to the Poso lake and Palu bay. On his first journey from Palopo, westwards along the Latupu river and southwards along the Maroro to the Chimpu, he found that a narrow coastal peneplain was succeeded by mountains chiefly of basic volcanic rocks, which culminated in the Bonto Puang, about 5200 feet high, which was afterwards found to consist of granite and a very beautiful granitic porphyry. Then followed a broad range of slates, interspersed with limestone and tuff, in which the Maroro has excavated a longitudinal valley, whence it strikes eastwards through a transverse valley, and enters the Gulf of Boni under the name of Jenemaja. Further inland lies the Latimojong range, the main watershed of this part of the peninsula, which consists chiefly of crystalline schists and crystalline limestones, including marble. It is covered for a third of the height from the crest with wood, and therefore the upper part probably consists of other than slate or schistose rocks. On another journey Heer Abendanon reached this range from the Chimpu river and bivouacked on the Bulu Palakka. Its height was found to be 10,290 feet, whereas it is given on the map of Central Celebes, on the scale of 1 : 500,000, as 12,120 feet. The highest peak of this range, Rante Kambola, is 300 feet higher, and is therefore much lower than it is marked on the map (12,600 feet). Southwards lay lower summits of the Latimojong mountains, which soon dip down to the lowland separating Central from South Celebes, while northwards other ranges were seen culminating in the blue line of the Central Celebes mountains, which apparently unite with the lofty Karo-uwe massif and the Tamboke mountains to the south-east of it. From the lofty folded elevation of the Latimojong, Heer Abendanon marched inland to the valley of the Sadang river and a new geological region of dark purplish-red and dirty red clay slates with a very broken relief, and then came to a volcanic formation, in which the larger western half of the source


CENTRAL CELEBES
Showing the explorations of
E. C. ABENDANON.
1909-10.
Natural Scale 1:3000000 or 1 Inch = 47·34 Statute Miles.
Statute Miles.
Route
Heights in feet.
120
121
MAKASSAR STRAIT
GULF OF TOMINI
GULF OF BONI
Donggala
Mt Loli 6710
Palu
Sidondo
L. Lindu
R. Loriang
Kulawi
Marge
Koro
Posso
Tawe Kuli
Tentena
L. Poso
R. Lee
Bada (Plain)
Tomori Bay
KARO UWE
Mt 6500
Lebonit
Masolangi (Pass) 4480
Takolekaju 5600
L. Malano
Petea
L. Mahalona
Tamboke Mt
Malili
Usu Bay
L. Towuti
Baruagnamase
Palopo
R. Latuppa
Malili
R. Jawaraja
Kalosi
Chimpa R.
Makalua
Bulu Palakka 10290
Enrekang
Mandar Bay
Jampua
Alita
Pare Pare

region of the Sadang is situated. Before reaching the main river and the volcanic area, the expedition crossed a limestone ridge with a height of about 6600 feet. The important Mamasa river, which in the map of Central Celebes referred to above is represented as flowing into the Masupu, was found to enter the Sadang itself at Tungka. These two rivers rise on either side of a watershed 5900 feet high and lying about on the parallel of Palopo and Rante Pao on the Sadang, the Mamasa running out of granite mountains and making a curve to the west. It has a regular fall for the greater part of its course down to a height of 1880 feet, and then descends rapidly with falls to 260 feet at its mouth in the Sadang. This latter river makes a bend to the west and enters the Mandar bay some 16 miles north of its old mouth at Jampua. Quantities of micaceous sand from the Sadang, Masupu, and lower Mamasa volcanic region are piled up at its mouth. On a subsequent visit Heer Abendanon came to the conclusion that the river at Jampua, the Saga Saga, was really the old mouth of the Sadang, while the Mamasa entered the sea at the present mouth before it was diverted to the Sadang at Tungka.

Very different is the tectonic structure of the south-eastern peninsula, where it adjoins Central Celebes. Whereas the southern peninsula is a folded region, with regular folds running north-west and north-north-west in the east to north-west and west-north-west in the west, at the base of the south-eastern peninsula there is no pronounced folding. Peridotites cover the country from coast to coast, here and there only overlaid with limestone belts, perhaps subjected to a slight folding. It seems probable that a line or zone of fracture runs north-eastwards from the north end of the Latimojong mountains along the north coast of the Gulf of Boni and right through the northern end of the south-eastern peninsula, while the extreme north-eastern part of the gulf may be a sunken anticlinal region, the depression extending inland. If it can be shown that the Tamboka mountains are a continuation of the Mekongka mountains south of the lake district, the theory of a tectonic structure of Central and south-eastern Celebes, to which Heer Abendanon has hitherto leaned, would be strengthened. In harmony with this is the remarkable zone of depression extending from the Palu plain past the Poso lake, the basin of the Malili river and south-eastwards to the Matarepeh and Lasolo bays. The uppermost lake in the drainage basin of the Malili, the Matano lake, was found to have a maximum depth of 1930 feet, and therefore it is one of the deepest in the world. The Sarasins' sounding-line, being too short, found no bottom at this spot. The temperature of the surface water, 82°, with an air temperature of 68°–70°, is due to the storing up of the heat of the sun, which is common in lakes. At the greatest depths the temperature is not more than 36° or 37°. The fish are of few species and in small numbers. The water passes through the Pété-A river into the small Mahalona lake, with a depth of

only 240 feet, which in turn drains into the great Towuti lake. This has a maximum length of 30 miles, a maximum breadth of 21 miles, and an area of 280 square miles. Its greatest depth, in its eastern part, is 666 feet, and its fauna and water flora are much the same as those of the Matano. All this basin has been produced by subsidence, followed in recent times by a slight regression of the sea, and the flat, marshy ground tends to dry up.

On his journey to the Poso lake Heer Abendanon marched northwards from Palopo to Leboni, the highest point reached being 5580 feet, while the Sarasins gave it at 6500. After leaving Leboni, he soon came into a region of granite and schists, which extends far to the east of the Poso. The Karo-uwe mountains were found to be certainly not higher than 6500 feet, whereas the Sarasins gave them a height of 11,500 feet; and, again, the highest point of the Musolangi pass proved to be 4490 feet, while the Takolekaju pass, according to the Sarasins, is 5660 feet, though this pass was said by the chief of Rato to be lower than the Musolangi. The Poso lake runs north 30° west; it has a length of 21 miles and a maximum breadth of $7\frac{1}{2}$ miles, and is, therefore, the smallest of the three large lakes of Celebes. The maximum depth measured was 1440 feet, and as the surface lies 1670 feet above sea-level, the bottom must be 230 feet above the sea. The water has a considerable rise and fall. The camping-ground at the southern end, which was 20 inches above the lake at the beginning of April, was 20 inches under water in the middle of May. Divergent opinions have been expressed regarding the origin of the lake-basin. Heer Abendanon believes that it is a fracture area in the peneplain of crystalline schists. A transgression of the sea took place, probably in Neogene or still later times, which, in conjunction with the Poso lake, formed the present Poso depression. In this sea sediments were laid down, the uppermost being a coral limestone, which has never been found south of the northern margin of the lake, and therefore the southern end of the old Poso bay must be sought for in the northern part of the lake. A ridge found in the southern part of the lake also indicates a sunken land rather than a sunken sea-coast.

From the Poso lake Heer Abendanon travelled westwards through the Bada plain to the Koro river, which enters the Macassar strait under the name of Lariang. The Bada plain, bordered on the north by mountains of granite and porphyry 6500 feet high, and also on the south by lofty elevations, seems to be a drained lake in the northern part of an older and much larger Bada-Leboni depression. On the journey the following geological areas were traversed: (1) mountains of basic eruptive rocks—peridotite, serpentine, and gabbro; (2) crystalline schists of various kinds; (3) granite mountains alternating on the west with diorite, and in the middle traversed by dykes of igneous and volcanic rocks; (4) an argillaceous formation; (5) the old Koro tilted deposits of conglomerates, grit, and sandstone; and (6) recent argillaceous deposits, also partly tilted.

The Palu bay is bounded on the west by heights gradually rising southwards and culminating in the Loli, 6710 feet high, while those on the east run into the ridge, quite 6500 feet high, which separates the Kulawi basin from the Lindu lake. It is 19 miles long, with a breadth varying from 4½ to 5½ miles. Probably the Palu depression was formerly an enclosed lake, being shut off from the sea by the elevations of recent volcanic rocks now found on both sides of the Palu bay, and steeply escarped fans near Sidondo seem to indicate more recent subsidence, since the water broke through to the sea and laid bare the plain of Palu, which is evidently tectonically continuous with the Kulawi basin.

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## ROYAL COMMISSION ON COAST EROSION.

By Dr. J. S. OWENS.

THE Third and Final Report of the Royal Commission on Coast Erosion was issued under date, May 31, 1911. The Commission was appointed under Royal Warrant, dated July, 1906, the Terms of Reference being to inquire and report :—

(*a*) As to the encroachments of the sea on various parts of the coast of the United Kingdom and the damage which has been or is likely to be caused thereby ; and what measures are desirable for the prevention of such damage.

(*b*) Whether any further powers should be conferred upon local authorities and owners of property with a view to the adoption of effective and systematic schemes for the protection of the coast, and the banks of tidal rivers.

(*c*) Whether any alteration of the law is desirable as regards the management and control of the foreshore.

(*d*) Whether further facilities should be given for the reclamation of tidal lands.

A further reference was added under a later warrant dated March, 1908 :—

(*e*) Whether in connection with reclaimed lands or otherwise it is desirable to make an experiment in afforestation as a means of increasing employment during periods of depression in the labour market, and if so by what authority and under what conditions such experiment should be conducted.

A large number of witnesses were examined, and their evidence analyzed. Committees of the Commission made inspections of various parts of the coast of the United Kingdom, and a Committee also inspected certain parts of the coast of Holland and Belgium.

The evidence is discussed in the Final Report under seven separate headings.

Part I. deals with "Physiographical and Geological considerations affecting the coast-line." The evidence bearing on changes of relative level of land and sea is analyzed ; but, it is concluded that the present state of our knowledge does not afford any indication as to whether we are now living in a state of exceptional stability of sea-level or merely in an interlude which may at any time give place to rapid changes. Erosion and accretion as factors in coastal changes are next considered, with the sources, travel, and preservation of beach material ; and conclusions are arrived at, especially relative to source and travel, which will be referred to again. A useful section then follows upon the geological features of the coast-line, in which the nature of the materials forming the coasts of England, Wales, Scotland, and Ireland is described, and its influence upon erosion.

Part II. covers "The Extent of Erosion and Accretion in Recent Years on the Coasts and in the Tidal Rivers of the United Kingdom." The evidence is considered under two heads: (*a*) Evidence based upon maps, under which that provided by the Ordnance Survey is dealt with; and (*b*) Evidence based upon local knowledge and given by witnesses in oral examination, and by local authorities and private owners in their replies to queries circulated among them.

Part III. is on "Engineering (Sea protection Works)," IV. on "Central and Local Administration," V. deals with "The Reclamation of Tidal Lands," VI. with "The question of Grants from Public Funds in Aid of Sea Defence," and VII. is a "Summary of Principal Conclusions and Recommendations."

The Conclusions and recommendations form the kernel of the whole report; and may be shortly summarized as follows:—

The amount and rate of erosion along the coasts of the United Kingdom is governed to a large extent by the geological formations on these coasts. The east and south coasts, where Secondary and Tertiary deposits form a large part of the coast-line, suffer most. The west coast of England and the coasts of Ireland and Scotland suffer less from erosion, as the harder and more ancient rocks appear there to a greater extent. Great losses have occurred in historic times, chiefly on the east coast of England; but great gains in the form of accumulations of shingle, sand, and alluvium have also occurred, more particularly in estuaries. These gains have been due partly to material derived from erosion of the cliffs along the coast, but mainly to sediment deposited by rivers. The following very important suggestion is made, which, if adopted, should help to clear up a very difficult question: "It would be of advantage if the Ordnance and Geological Surveys could take steps to ascertain from time to time whether and if so to what extent changes in the relative level of land and sea are taking place."

Relative to the shingle and sand which form a natural protection to the coast, the Commissioners concluded that they are derived almost entirely from the erosion of the land, and that a certain amount of erosion must therefore take place to provide a supply to the beach. Shingle and sand are stated to travel as a rule along the shore in definite directions, usually those of the waves as governed by the prevailing winds, and the travel may be arrested by headlands, river-mouths, groynes, piers, and harbours. These conclusions are of such importance that it may be well to indicate that they are expressions of the Commissioners' opinion rather than ascertained facts.

A strong case may be made out showing that much of the sand on our foreshores is derived from the sea-bed, and that the movements of sand and shingle are governed by different factors, sand moving with the currents and shingle with the waves.

The Commissioners state that the artificial removal of material from the shore and even below low-water mark has resulted in much erosion in neighbouring parts of the coast. The preservation of sand-dunes by encouraging the growth of marrum grass is recommended, as is also the plantation of suitable vegetation such as "rice grass," *Spartina*, on alluvial flats to hasten the process of accretion.

As to total superficial area gained or lost in recent years in the United Kingdom, the evidence shows that far larger areas have been gained by accretion than have been lost by erosion. From the figures supplied by the Ordnance Survey Department, it appears that within a period of about thirty-five years about 6640 acres have been lost to the United Kingdom while 48,000 acres have been gained. This gain has been chiefly in tidal estuaries and the loss has been

on the open coast. The Commissioners believe that the erosion would have been far more serious if extensive works of defence had not been constructed by local authorities, railway companies and others. It is concluded, however, that "while some localities have suffered seriously from the encroachments of the sea, from a national point of view the extent of erosion need not be considered alarming." This is probably the most important conclusion come to by the Commission; but it is one with which some will not agree, since a comparison of the superficial area only of land gained or lost may appear insufficient to base such a profoundly important conclusion upon. It may be mentioned in this connection that the open coast, where the evidence before the commission showed erosion was limited to, is very often high land terminating seaward in a cliff. The average height of eroded land is probably at least 20 feet above H.W.O.S.T., whereas the land gained is in most cases below the level of H.W.O.S.T. If these two types of land are compared from the point of view of permanence when attacked by the sea, the low, reclaimed land might be inundated and lost possibly in a single night if once the protective banks were breached; whereas the high land can only be eaten away slowly from the edge, and the loss of a large area is a matter of some time. This is a very important difference. Further, it is usual, as the evidence before the Commission also showed, to find erosion on promontaries or projecting land, accretion in bays and estuaries; in short the promontaries shield the bays and estuaries, and supply much of the material which accumulates there. When, however, the high, projecting land has been eroded away a time may come when the low land will be again lost, not piecemeal, but by great inundations through breaches in the sea-banks no longer shielded by the promontories. This aspect of the question does not appear to have been considered in the Report. In short, a continuous loss of *material* can hardly be compatible with a continuous gain in *area*, when a sufficient period of time is taken into account.

Relative to the method of dealing with sea defences the Commissioners think that a "sympathetic and tactful supervision" by the central bodies should be exercised over the local authorities and private owners, especially with a view to preventing the erection of unsuitable works, or works which might injure the adjacent coast-line. They recommend that legislative provision should be made for the administration of such foreshore as remains Crown property by one Department, viz. the Board of Trade; a transfer being made to that department of that part which is now under the control of the Commissioners of Woods and Forests. It is also recommended that a clear right of passage on foot upon all foreshores in the United Kingdom be conferred on the public in addition to the rights of navigation and fishing which they already possess. This right to be subject to restriction in certain places by the Board of Trade. The Commissioners advise that the Board of Trade be constituted the Central Sea Defence Authority for the purpose of administration of the coast-line in the interests of sea defence, and that powers should also be given to that Board to control (*a*) the removal of material and the construction of works on the shores of the Kingdom, and (*b*) to supervise and assist, where necessary, existing authorities concerned with coast protection, and to create new authorities where necessary. A very valuable recommendation is also made to the effect that the Board of Trade should "have the assistance of scientific experts to collate information and to secure systematic observations with regard to questions such as the changes taking place below the level of low water, the travel of materials in deep water, the movements of outlying sandbanks, etc., which are continually happening on the coasts of the Kingdom, and with regard to which the information at present is scanty and vague."

Referring to reclamation, the Commissioners find that there are areas of tidal lands, especially in Ireland, which could be reclaimed with profit to the community. And they suggest that the Board of Trade should be charged with the duty of scheduling and obtaining detailed and scientific reports upon such lands in the United Kingdom as come to their knowledge as being *primâ facie* capable of profitable reclamation, and that in this the Board should obtain the co-operation of the Development Commissioners.

In the concluding paragraph of the report it is stated "we cannot see that there is any grounds for the contention that sea-defence is a national service; it is true that there is serious erosion in places, but this erosion does not affect the nation at large. We therefore recommend—that the making of grants from public funds in aid of sea defence should not be encouraged."

Certain members of the Commission have signed the report subject to reservations, which are set forth separately at the end.

Drawings are given illustrating a few of the types of sea defences used on the south and east coasts of England and on the coasts of Belgium and Holland.

A careful study of the evidence given before the Commissioners shows that there were great differences of opinion with regard to important questions; and some of the conclusions arrived at have been based on witnesses' opinion in the absence of direct experimental evidence or ascertained facts. Now there are few subjects on which opinion differs so widely as upon some of the questions relating to the movements, and agencies governing the movements, of shore material. It is to be hoped, therefore, now that the Commission has laid bare the paucity of our *knowledge*, and the consequent differences of *opinion*, in relation to some of the most vital problems bearing on coast erosion and protection, the recommendation as to securing systematic observation and collating information will not be allowed to become a dead letter. It may be useful to summarize here a few of the problems which still require definite solutions, not by inference based on insufficient information—the cause of differing opinions—but by skilled experiment and observation. A simple enumeration of some of these problems must suffice: (1) The question of alteration in relative level of land and sea. (2) The relative amounts of shore material derived from land erosion and the sea bed. (3) The relation between erosion of the coast and erosion below L.W.M., and between foreshore drift and drift below L.W.M. (4) Depth to which wave action extends. (5) Rate of wear of shingle, especially flint pebbles. (6) Ultimate destination of material derived from coast erosion.

The Minutes of Evidence contain a most valuable collection of information relating to coast erosion, and should be perused carefully by all who are interested in the subject. The evidence is analyzed in a masterly manner in the Final Report, and the three volumes published by the Commission should prove of very great value as works of reference.

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## PROF. HELLMANN ON THE FLOODS OF THE ODER.*

By HUGH ROBERT MILL, D.Sc.

Colonel Close, in his recent address as President of Section E of the British Association, called attention to "the extremely frank way in which vulcanology,

* 'Meteorologische Untersuchungen über die Sommerhochwasser der Oder,' von G. Hellman und G. v. Elsner. Mit einem Atlas von 55 Foliotafeln. Berlin: Behrend & Co. 1911.

seismology, meteorology, climatology, terrestrial magnetism, anthropology, and ethnography are included in Geography." He went on to say that the papers "on meteorology and climatology" which had been read before the Royal Geographical Society during the last five years might have been read with perfect appropriateness before the Meteorological Society, and made the suggestion that the authors who send such papers to the *Geographical Journal*, instead of sending them to the *Journal* of the Royal Meteorological Society "in so doing appeal rather to the public at large than to men of their own special sciences." If this opinion be accepted, it places a geographer who is asked to review a meteorological work for a geographical society in a somewhat awkward position; for it would follow that such a work must be presented to the readers of their journals not as geographers, but as members of the public at large. I, on the other hand, hold so different a view of the relation to geography of the sciences referred to, and of geography itself, that in writing as a geographer for geographers, I feel that I must vindicate my position before taking up the subject of this review.

In the article "Geography" in the *Encyclopædia Britannica*, 11th edition, I said: "Geography is a synthetic science dependent for the data with which it deals on the results of specialized sciences, such as astronomy, geology, oceanography, meteorology, biology, and anthropology, as well as on topographical description. The physical and natural sciences are concerned in geography only as far as they deal with the forms of the Earth's surface, or as regards the distribution of phenomena. The distinctive task of geography as a science is to investigate the control exercised by the crust-forms directly or indirectly upon the various mobile distributions. This gives to it unity and definiteness, and renders superfluous the attempts that have been made from time to time to define the limits which divide geography from geology on the one hand and from history on the other."

If this view of geography is kept in mind a paper on the distribution of rainfall would be seen to be more appropriate to a geographical than to a meteorological journal, because the distribution is conditioned by the relation of land and sea, the tracks pursued by atmospheric depressions, and the configuration of the land. A paper on the formation of rain would, of course, be more appropriate to a meteorological than a geographical publication, because it deals with the non-geographical part of the subject. In general, I consider that no discussion of the distribution of anything is foreign to geography, although the thing in other than its distributional aspect may be the subject-matter of another science. If Colonel Close is right I am wrong in my point of view, and the Editor of the *Geographical Journal* is wrong in inserting this notice, for it is not directed to the public at large, but to those trained in geography, or at least so far interested in geography as to have an interest in it greater than that of the casual reader.

Prof. Hellmann is the Director of the Prussian Meteorological Institute, and after the exceptionally severe floods in the Oder in July, 1903, he was charged with the investigation of the rainfall which produced such floods in order to discover whether they could be predicted at a sufficient distance of time to enable the inhabitants of the area affected by them to escape from the danger. To this end he studied the circumstances of all the earlier summer floods of the Oder as regards the heavy rainfall which produced them, going back to the year 1888, when he had established the system of rainfall observations in the Prussian province of Silesia, through which the upper waters of the Oder run. The Prussian network of stations was not enough, and it was necessary to collect statistics of daily rainfall, pressure, and temperature from the southern German

states, from parts of France, Switzerland, Italy, Austria-Hungary, and Russia before the rainfall, pressure, and temperature maps of the days preceding the various floods could be constructed. The various maps deal with nearly the same extent in latitude and longitude as the British Isles, but as it was practically all land, with only small segments of the Mediterranean in the south, and of the Baltic in the north, they embrace a far larger area than the British Isles. Pressure and temperature maps were constructed from about 400 points for two or three separate hours of each of the days concerned, and they are reproduced on a small scale; rainfall maps were drawn from about 2400 points, and of these only a selection is published though upon a large scale, the 55 large plates containing the series accompanying the volume of letterpress in an imposing portfolio. As constant reference is made in the text to the mountain ranges, we should have been helped if some indication of the orography had appeared on the maps.

Twenty-one floods were investigated in this way, and it was shown that they were all produced by heavy rains of the cyclonic type, occasionally reinforced by local thunderstorms due to small secondary depressions attendant on the main area of low pressure. In only three cases did the depression producing the floods travel in from the westward by way of the Baltic. This is interesting, because in Germany as in the British Isles most of the disturbances of weather, taking the year all round, are produced by storm systems bred in the Atlantic and sweeping in across the land. The cyclones which produced eighteen out of the twenty-one serious summer floods in the Oder came from the south or south-east. They originated in the northern plain of Italy, or in the Balkan Peninsula or in Hungary, and pursued on the whole a northerly path until in the immediate neighbourhood of the Oder sources, when they sometimes curved abruptly to the left before they died away. While the fact that the rain fell in greatest quantity on the west or north-west side of the barometric depression coming from the south * is purely meteorological, and, so far as we can tell, quite independent of all geographical considerations, this is almost the only purely meteorological fact in the whole discussion. The direction which the cyclone track is caused to take by the grouping of high and low pressure areas in the atmosphere over Europe is determined more by geographical than by meteorological conditions, though the geographical conditions in this case act both directly and indirectly. As we follow the unfolding of the complicated interplay of agencies through the maps and text we become more and more impressed with the fact that a mere meteorologist, however learned he may be in atmospheric physics, could not have cleared up the difficulties presented by the problem with the clearness and completeness which has been achieved by the authors. The training which made Dr. Hellmann the successor of von Bezold as Director of the Prussian Meteorological Institute, was necessary for this undertaking, but no less necessary were the interests the pursuit of which made him the successor of von Richthofen as President of the Berlin Geographical Society. I do not suggest that the whole problem of the cyclones crossing central Europe from the south has been solved by this investigation, but much light has been thrown on what was formerly a very dark question.

The distribution of atmospheric pressure which precedes most of the destructively rain-bearing cyclones in the Sudetes region includes a belt of high pres-

* I may point out that this accords with my generalization that the area of greatest rainfall lies, as a rule, to the left of the centre of a moving cyclone in the British Isles whatever be the direction of motion, a fact deduced from the systematic mapping of heavy rainfalls in 'British Rainfall' during the last ten years.

sure in western Europe with a very characteristic wedge of high pressure on the northern side of the Alps, the apex of which sometimes stretches as far as Hungary. The origin of this remarkable condition is traced to the difference of temperature between the northern and southern slopes of the Alps, and were it not for the mountains this particular distribution of pressure could not arise. Another characteristic condition is an area of low pressure in the Baltic, and a trough of somewhat low pressure extending from it to the east of the wedge of high pressure north of the Alps. When the aerial way is thus prepared a small depression forming typically in the Plain of Lombardy travels northward, never crossing the central Alps, but making its way across the lower eastern ranges, and growing in intensity as it passes northward along the trough of low pressure. If the conditions which determine the path impose a north-easterly course on the developing cyclone, it may pass so far to the east as to leave the region of the Oder sources outside the danger zone of rains, and if so it is not pursued by the authors, though there is little doubt that it causes floods in the northern rivers of Russia. If the track carries it near the mountains where the Oder rises so that the rain zone lies over the upper tributaries, the heavy rainfall inevitably gives rise to a serious flood. In the case of a full-grown oceanic cyclone crossing southern England, I have shown that the ascending air-currents due to meteorological causes are so much greater than the uplift due to the air passing over the hills, that the rainfall is conditioned solely by the cyclone, and not perceptibly modified by the configuration.* Prof. Hellmann points out that a lofty snow-clad range, on the other hand, interposes a bar that a cyclone cannot pass; but that mountains of intermediate height, such as the Sudetes, Riesengebirge and Erzgebirge, around the sources of the Oder can and do intensify the cyclonic uplift to such an extent as to cause a far greater precipitation of rain on the high ground and the leeward slopes than on the plains beyond, where the heavy but not prodigious fall of rain is due to the cyclone alone. Thus it is that in one of these storms a rainfall of 13·80 inches was experienced in twenty-four hours on the southern slope of the Riesengebirge, and 21·16 inches at a station on the northern slope. Such a downfall is, of course, very rare, and necessarily very destructive.

After discussing various alternative methods of predicting such storms in advance, Prof. Hellmann sees the only prospect of success in a development of the method of synoptic weather charts constructed at frequent intervals, he suggests three times per day, from a much larger number of points than are usually employed. In the isobaric maps accompanying the report he shows how greatly the detailed outline of a cyclone plotted from several hundred barometer stations differs from the simple concentric rings which do duty on ordinary weather maps. It is not uninteresting to find that the better mapping of weather conditions, surely an operation which appeals to all geographers, presents the most hopeful prospect of anticipating, and thus of providing against, catastrophes of a magnitude happily unknown in the river-basins of our islands.

* "Map Studies of Rainfall," in *Quarterly Journal* of the Royal Meteorological Society, vol. **34** (1908), No. 146.

# MEAN SEA-LEVEL.*

By Captain E. O. HENRICI, R.E.

I HAVE been asked to give a paper on Mean Sea-level, and the present knowledge of the subject as regards the coasts of Great Britain. The subject has also been raised by the report of the Royal Commission on coast erosion, where it is stated that there is some evidence of sinking going on at the present time in Northumberland and Durham, and that it would be advantageous if the Ordnance and Geological Surveys could take steps to ascertain from time to time whether, and if so, to what extent, changes in the relative levels of land and sea are taking place.

The only method of determining whether the land is actually rising or sinking with reference to the sea is by means of accurate observations of mean sea-level with reference to marks on shore.

The sea-level is, however, constantly altering, not only with the tides, but also with the winds, height of the barometer, and (especially near the mouths of rivers) with the rainfall. In consequence of these variations observations continued over a period of a few weeks, or even months, will give a mean value which is far from constant. In other words, if a continuous series of observations is taken for some years, and the mean sea-level be reduced for each month, the mean value will vary considerably from month to month, and even from year to year. For example, continuous records have been taken at Brest since 1851, and the mean sea-level, as calculated for each year, has varied between −6 mm. (in 1870) to +100 mm. (in 1903), or a variation of over 4 inches. Since writing this I have seen records for Southend which give much the same variation. The variations from month to month are considerably larger. The mean height for one year at some Indian stations varies up to nearly 2 feet.

It will be seen from the above that it is necessary to take accurate observations continuously over a long period of years before it is possible to make any deductions as to the rise or fall of the land with reference to the sea. Theoretically, considering the variations due to the tides alone, a period of nineteen years would be required. It is also necessary, for accurate results, to ensure the constancy of the height of the zero of the gauge with reference to the land, by periodical levelling to several good permanent bench-marks which shall be as little liable as possible to disturbance.

*Present data.*—Observations at some two dozen stations round the coasts of Great Britain were taken by the Ordnance Survey in 1859. The observations were taken every ten minutes on a simple tide gauge, for one complete tide a day excluding Sundays, for one complete lunation. The observations at some twelve of these stations were repeated in 1895. The differences of mean sea-level as deduced from these two sets of observations varied from +1 foot to −0·7 foot, with an average of +0·26 foot. In other words, the mean sea-level has apparently risen on an average 0·26 foot at the stations observed.

These observations were, however, carried out over much too short a period to enable any conclusions to be drawn as to earth-movements, the differences being very much what one would expect.

There exist some fifteen recording tide gauges round the coasts of Great Britain, as well as others at some distances up tidal rivers. These gauges are

* Paper read at the British Association, Section E, Portsmouth, September, 1911.

in the hands of various authorities, and are of various patterns. In some cases the records are available for the last fifty years. These gauges are installed in order to obtain tidal records for navigation purposes, and no very great accuracy is necessary for this. I have not full information on the point, but it seems probable that in most cases the connection between the zero of the gauge and a good bench-mark on shore is the weak point, and that the height of the zero line on the records, as compared with a datum on shore, may vary some inches from time to time.

These records have not been reduced to determine mean sea-level. In most cases the mean high and mean low water have been reduced, and the mean of these taken as mean sea-level; this would be better described as "mean tide-level," and is not necessarily the same as mean sea-level, especially in restricted waters such as exist at most of the stations where these gauges are fixed.

An excellent series of observations that I have seen, and that are reduced to give both mean sea-level and mean tide, are those of the U.S.A. The differences are very small, the maximum being 0·17 foot. The stations appear to be, however, on the open sea.

As regards the relative value of the height of mean sea-level round the coasts of Great Britain, as determined by levelling between the different gauges, the primary network of level lines of Great Britain (as far north as Edinburgh and Glasgow) was completed in 1860, and the closing errors adjusted by the method of least squares. Each line was double-levelled (in opposite directions), and was weighted in the reduction inversely as its length. The probable error per mile as deduced from the deduction was 0·0182 foot.

It is possible, therefore, that there may be an error of a foot in the determination of the height of the zero of a tide gauge as compared with Ordnance Datum (*i.e.* assumed mean sea-level at Liverpool). There may also be an error of a foot in the determinations made by the Ordnance Survey of the height of mean sea-level as compared with the zero of the tide gauge. The values for the height of mean sea-level above or below Ordnance datum varied from 0 to nearly 2 feet, with an average of 0·65 foot above. These variations are about what is to be expected from errors of observation, and do not afford any evidence that the mean sea-level is not constant round our coasts.

It is proposed by the Ordnance Survey to revise the initial network of levels, and it is hoped that, owing to developments in the theory and practice of precise levelling, the result will give a considerably more accurate network of levels than that obtained by the old work of fifty years ago.

The question of observations to determine more accurately the mean sea-level is under consideration. It would appear that the best and simplest apparatus for this purpose is the Médimarémètre designed by M. Lallemand, director of the French levelling. This apparatus may be shortly described as a tide gauge in which the oscillations of the sea-level are very much "damped." One reading only is taken per diem; the mean of these readings over a lunar month is very nearly the mean sea-level for that period, and the mean of these for a year may be taken as the mean sea-level for that year. This apparatus is cheap and simple to install and maintain. The connection between the height of the zero of the instrument and that of fixed marks on shore can be easily made and maintained, and the reductions are simple.

It seems doubtful whether the labour of reducing the records of the existing recording tide gauges would be justified by the result.

# THE HEIGHT OF RUWENZORI.*

By Captain E. O. HENRICI, R.E.

It was mentioned in the report of the Committee on the Geodetic Arc in Africa, presented last year at Sheffield,† that observations were taken by Captain Jack, R.E., in the course of the geodetic work, to determine the height of Ruwenzori. The computations were not completed by the time Captain Jack had to leave England, and the data were left in my hands.

The initial mark, with reference to which the heights were determined, was the station peg at Lake Albert station. The heights of all the stations observed in the arc triangulation were computed, and the probable errors of the results rigidly determined. From three of these stations, viz. Omunturok, Oruha, and Kasunju, horizontal angles were observed into the highest point of Ruwenzori. These agreed well, giving the position of the highest point 0° 23′ 10·690″ N. lat., and 0° 49′ 31·949″ long. west of Kicherere. This gives the position of the highest point of Ruwenzori : 0° 23′ 10·690″ N. lat., 29° 52′ 15″ E. long.

Vertical angles were observed from four stations, viz. Muruha, Kabuga, Singirro, and Oruha, giving a mean value of 14,768·1 feet above Lake Albert station, with a probable error of ±2·1 feet. The mean probable error of the stations from which observations were taken was ± 1·3 foot. The coefficient of refraction was taken at 0·060, a figure arrived at after a study of the values for the stations on the arc at which reciprocal observations were taken.

The height of Lake Albert station was arrived at as follows: The mean height of the station peg above the lake, May to July, 1908, was 5·30 feet. The mean reading on the tide gauge at Butiaba during the same period was 2·75 feet.

The height of the zero of the tide gauge is given as 617·350 m. above mean sea-level at Mombasa in September, 1907, by Mr. Welldon (Egyptian Survey), and by Mr. Landon (Egyptian Irrigation Service) as 617·197 m in February, 1909. Both heights are apparently obtained from a good bench-mark at Butiaba, which is connected both by spirit-levelling and by trigonometrical heights to Entebbe, hence by two years' comparisons of tide gauges with the railway levels at Port Florence, and thence to Mombasa by the railway levels.

There is no evidence to show the cause of the discrepancy between the two values for the Butiaba tide-gauge, so a mean of the two values has been taken. We get, therefore : mean height of Lake Albert, May, to July 1908, 2,027·9 feet ; height of Lake Albert station, 2,033·24 feet. The probable error of this latter value may be roughly taken at ±4·7 feet, hence height of Ruwenzori (highest point), 16,801·3 ±5·3 feet.

As regards the above figures, they are simply worked out from the data left by Captain Jack, and the probable error does not take into account the error due to uncertainty of refraction.

In a paper published in the *Geographical Journal* for March, 1907, the following figures were given : Position, 0° 23′0″ N. lat., 29° 52′ 20″ E. long. ; height from the best trigonometrical data at the time, 16,619 feet ; height as determined barometrically by the Duke of the Abruzzi, 16,814 feet.

The discrepancy between these figures for the height is very large. The discrepancy as regards position is unimportant, as Captain Jack's are based on a rough longitude and on one astronomical observation for latitude; they will probably have to be amended later.

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* British Association, Section E, Portsmouth, September, 1911.

† See British Association Annual Report for 1910, pp. 75–76.

As regards the discrepancy in the height, this is probably due to a wrong coefficient of refraction having been assumed.

The coefficients for the different lines where Captain Jack took reciprocal observations varied from 0·04 to 0·09, or, omitting lines with exceptional features, from 0·057 to 0·076, with a mean of 0·064. The longer lines to high points giving as a rule the lower values, the value 0·060 was selected for computing the height of Ruwenzori as stated above. This is probably on the low side, but if 0·065 be taken the difference is only 20 feet.

The older observations by Captain Behrens, R.E., were taken from an average distance of 500,000 feet, or about twice the distance of Captain Jack's. Captain Behrens took many observations for refraction, and arrived at the figure of 0·080 for rays taken at about the same time of day as his rays to Ruwenzori. Long rays to high points would be, however, less affected by refraction than ordinary rays, hence the figure 0·080 appears high.

In combining these two values it must be remembered that an error in the coefficient of refraction produces an error in the result proportional to the square of the distance, consequently the different observations should be weighted inversely as $d^4$, where $d$ is the length of the ray.

As it is impossible to be sure of one's coefficient to within 0·005 or even 0·01, a set of observations taken from a great distance such as 100 miles, may easily be out 100 feet in the result, and these cannot therefore be given a greater weight than good barometric heights, taken as carefully as those of the Duke of the Abruzzi.

On the above considerations, I should weight the different observations as follows:—

| | | |
|---|---|---|
| Captain Jack ... ... ... ... ... ... | 16,801 | wt. 16 |
| Captain Behrens ... ... ... ... ... | 16,619 | ,, 1 |
| Duke of the Abruzzi ... ... ... ... ... | 16,814 | ,, 1 |

giving a final result, in round figures—

Height of Ruwenzori, 16,790 feet, with a probable error of $\pm 20$ feet.

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## REVIEWS.

### EUROPE.

'La haute Loire et le haut Vivarais.' Par Marcellin Boule. (Paris: Masson, 1911. *Maps and Illustrations.* 4.50 *fr.*) This addition to the guide-books of the Boule Collection is arranged on the same principle as the preceding volumes, the first half being divided into chapters on the geography, geology, botany, etc., of the region, and the latter being the guide-book proper. The district has much to recommend it to the ordinary tourist, and particularly, perhaps, to those with an archæological bent. The characteristics of the inhabitants, as described, are attractive. They are proverbially "born dancing." There are numerous maps, plans, and small illustrations.

### ASIA.

#### PALESTINE.

'Palestine and its Transformation.' By Ellsworth Huntington. Pp. xvii. and 443. *Illustrations.* London: Constable & Co. 1911.

Mr. Huntington is already well known as an advocate of the theory of pulsatory changes of climate in Asia and in other lands, and also as an exponen

of the secondary and consequent theory, that such pulsations account for local variations in social prosperity. He applies his theory, in the book before us, to the small but very remarkable geographical area of Palestine. It is a most closely studied and suggestive book, and moreover very excellently written. The smallness of the area has enabled the author to deal with topographical features unusually minutely and comprehensively, and the extraordinary variety of these has given him occasion to treat of almost every geographical condition which affects human life.

It is in illustration rather of his secondary than of his primary theory that Mr. Huntington has written this book; and therefore a reviewer need not discuss how far the occurrence of climatic changes of sufficient regularity of interval to be justly called pulsations has been established, and if not, whether there is anything very novel about what is left of the primary theory. For in that case it would amount to no more than acceptance of the undoubted fact of progressive desiccation in Asia, which has proceeded, as we always assume climatic variations to proceed, by irregular ups and downs with an ultimate downward tendency—such a process, in fact, as is illustrated by Mr. Huntington's diagram on p. 403 of the book before us. The most interesting and valuable of the author's propositions is the secondary one, that social variation has always followed climatic variation. The general truth of this proposition would hardly be denied by any one. Certainly in a country, situated and circumstanced as Palestine is, any long period of either considerably more droughty or considerably more humid climate than the average could not fail to cause marked social changes. The conditions of human prosperity there are too meagre and sensitive for the case to be otherwise. Nor could any one, with the evidence of the Dead sea strands before him, and that of the contrast between the population of Central Syria to-day and the population attested by hundreds of ruined and deserted and almost waterless cities and villages of the early centuries after the Christian era, argue against either the fact of local desiccation, or the fact that social changes have been due thereto. The only point on which a critic can join issue with Mr. Huntington is his apparent (for perhaps it is only apparent) neglect or denial of the validity of other contributory causes of these changes. His fondness for his own theory of climatic variation and his limitation of his survey to geographical conditions, very minutely—almost meticulously—studied, do certainly leave the reader with a vague impression that history is interpreted exclusively in terms of geography, and that progressive decline of race is to be explained by no other changes than those of rainfall.

With this reservation—which amounts to no more than a warning to the reader not to forget secondary causes in reading a remarkably seductive and often convincing exposition of the primary cause—we congratulate Mr. Huntington on the most illuminating study of Palestinian geography which has yet appeared. There lie behind this book wide knowledge of other cognate geographical conditions, very careful exploration of Palestinian topography, and thorough examination of the historical data. It is a most creditable and worthy outcome of the Yale expedition.

The area explored coincides pretty closely with that usually known as Palestine, including the trans-Jordanic regions as far back as Jebel Hauran. The author begins his survey with Philistia, and rightly makes much of the great continental road which passed through that country and always was the main influence on its history; and though we think he presses rather too far the geographical influence of the low Shephelah, and the physical distinction

between the Judæan plateau and the Samaritan area, his insistence serves to stamp on the memory the features of these regions better than any other description we have read, not excepting Dr. George Adam Smith's. In the desolation of the Negeb we should allow more for Arab invasion and the non-agricultural Arab character than Mr. Huntington does; and in Galilee more for Aramæan invasion, which has had, in our opinion, as much to do with the differentiation of the north from the south of Palestine, as any climatic change. But when the author passes to the Ghor and the Dead sea we have not a word of criticism. His account of the topography which has made that extraordinary region so potent a defence to the west and so strong a dividing line of societies is admirable, and one can only regret that he was prevented by accident from making a more thorough exploration both of the surface and the bed of the Dead sea. He was the first to discover volcanic *ejecta* at the north end, and so to justify the native tradition which points to that quarter for the phenomena which originated the legend of the destruction of Sodom. He concludes with a chapter on Palmyra and some general *résumés* of the evidence. We know no book at once so soundly scientific and at the same time so delightfully readable. No one who contemplates a visit to Palestine ought to omit to study it beforehand. It will add enormously both to the profit and pleasure of the tour.

D. G. H.

### Rennell's Journal, 1764–1767.

'The Journals of Major James Rennell.' Edited by T. H. D. La Touche, of the Geological Survey of India. ('Memoirs of the Asiatic Society of Bengal,' III. No. 8, pp. 95–248.)

Major Rennell's Journal during his survey of the Delta of the Ganges from 1764–1767 is in a small quarto volume, all in his own handwriting. It was presented by his great-grandson, Sir James Rennell Rodd, to the Victoria Memorial collection, which was made under the auspices of Lord Curzon in 1906. The Journal has now found a very competent editor in Mr. La Touche, of the Geological Survey of India. The editor is well acquainted with the region covered by Rennell's surveys, and has been diligent in identifying localities and recording changes in the courses of rivers.

Major Rennell's surveys are very important from the point of view of physical geography, because they are the first exact delineations of the great region of the Gangetic Delta; in fact, the standard with which all subsequent changes can be compared.

Rennell was an eminent geographer *per se*, being versed in all the branches of that clearly defined science, with special knowledge of more than one of them. He was a marine surveyor, a land surveyor, a very distinguished cartographer, a student of physical geography, an oceanographer, and one of the most eminent of our historical and comparative geographers. Anything written by such a man is valuable, and Mr. La Touche deserves our thanks for the excellent way in which he has edited Rennell's Journal.

C. R. M.

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'An Historical Relation of Ceylon.' By Robert Knox. Edited by J. Ryan. (Glasgow: MacLehose. 1911. Pp. xxv., 460. *Map and Illustrations.* 12*s.* 6*d.*) Robert Knox, who was a captive in Ceylon from 1660 to 1679, was gifted with a simple directness of style and a great power of observation and description which make his narrative pleasant reading. His volume upholds the reputation of Messrs. MacLehose's series of early travels for careful editing and admirable

printing and reproduction of contemporary maps and illustrations. Moreover, the present publication is the more appropriate and important inasmuch as little was known of Knox's early life till the discovery last year of a copy of his 'Historical Relation' with his own notes and additions in the Bodleian Library.

'L'Indochine Française. By H. Russier and H. Brenier. (Paris: Colin. 1911. Pp. 356. *Maps and Illustrations.* 4 *fr.*) This is a new issue of a work which has a high reputation among the many not dissimilar French treatises on Indo-China. It is, however, a more strictly geographical study than most; very full attention is given to the physical geography of the region, and some fair coloured contour maps illustrate this part of the subject. In the remainder of the volume the native inhabitants and the economic products and conditions are the most important topics, and there is a valuable economic map of the whole region. The geographical attitude of study is always prominent.

'Among the Tribes in South-West China.' By S. R. Clarke. (London: Morgan & Scott. 1911. Pp. xviii., 315. *Maps and Illustrations.* 3*s.* 6*d.*) This is a volume by a missionary, a considerable part of which deals purely with the history and results of missionary work. But the author, out of thirty-three years' experience, has much to tell of the history, character and customs of the people among whom he worked—much, indeed, which can hardly have been told before, for he has worked in a little-known field. The tribes dealt with, it should be added, are the non-Chinese Kiaos and Chung-chias.

'From Western China to the Golden Gate.' By R. Sprague. (Berkeley, Cal.: Lederer. 1911. Pp. 128. *Illustrations.* 85 cents.) This little book deals principally with China. It is without a map, and it is not always easy to follow the traveller's route from his narrative. He lays stress on his description and unique photographs of the remarkable huge figure of Buddha, carved in a hill-side above Kiating.

'Strange Siberia.' By M. L. Taft. (New York: Eaton & Mains. 1911. Pp. 260. *Illustrations.* $1.) A sufficiently entertaining account of Russian scenes and customs, strung on the thread of a journey over the Trans-Siberian railway. The book is of convenient pocket size, and well produced, but the illustrations are not inspiring.

## AFRICA.

### A Journey through Central Africa.

'From Rhodesia to Egypt.' By Theo Kassner, F.R.G.S. London: Hutchinson & Co. 1911.

This is the record of a journey, begun towards the end of 1907 and occupying more than a year, through Central Africa along the line of the great lakes. While Mr. Kassner does not claim to be an explorer, his route led him into regions and among peoples which are still imperfectly known. His interests apparently are equally divided between the country and its inhabitants. His concern in the economic development of Africa and his geological training are everywhere evident in his simply written narrative. He has curious adventures enough to relate to render his book attractive to the general reader. The most stirring sight he witnessed was west of Tanganyika, when two tribes engaged in battle, and the victors—Balubas—proceeded to roast and eat the bodies of their dead foes, unwitting that a white man was a spectator of their feasting. Mr. Kassner also depicts the ravages of the sleeping-sickness, of which he saw many evidences. His ethnographic observations add to our knowledge, but would be of more

value if he always identified the tribe about which he is writing. His descriptions of the scenery of Tanganyika and Ruwenzori are distinctly good. The author mentions many places he visited which he states are suitable for white colonization, and in some instances he is doubtless right. When, however, he declares Uganda eminently suitable for European settlement, and also considers that a large part of the Congo territory is much better suited for colonization by whites than is South Africa, we fear his enthusiasm has led him astray. His warnings about the destruction of rubber trees should be taken to heart by the various colonial administrators. He writes generously of the Congo administration, and is fully justified in testifying to what came under his own observation, though on the broad case the facts are against his conclusions. He is right, however, in considering that the economic régime of King Leopold, rather than "atrocities," was the root evil of the "Free State" system.

## AMERICA.

'The Golden Land.' By A. E. Copping. (London: Hodder & Stoughton. 1911. Pp. xvi., 263. *Illustrations.* 6*s.*) An honest attempt to set before those who are in any way interested in emigration from this country to Canada, an estimate of the possibilities and probabilities attending good workers. We write "good workers" advisedly, for while the whole tone of the book is highly optimistic, it is made abundantly clear that success is not found for the mere asking. Numerous personal examples are given. One of the most interesting sections geographically is that dealing with the irrigated lands of the dry belt. There are coloured illustrations, rather crudely reproduced.

'Nova Scotia.' By Beckles Willson. (London: Constable. 1911. Pp. xii., 256. *Map and Illustrations.* 10*s.* 6*d.*) This is an interesting and well-illustrated book, and there should be room for it, for it is true that, by the stream of visitors and emigrants to Canada, Nova Scotia tends to be passed by. There is a clear enough geographical reason for this, though it is not made very clear in the writer's pages. The summer highway of the St. Lawrence, however, offers sufficient temptation in itself to lead the traveller past Nova Scotia. This book deserves to counteract that influence, and certainly the province appears to deserve that it should be counteracted.

'The Mexican Year-book.' (London: McCorquodale. 1911. Pp. vii., 474, lxxxviii. *Maps.* 21*s.*) The fourth annual issue of this handbook maintains its high standard of production and arrangement. The economic resources of the republic are treated in very full detail, not only for the whole country, but for each state individually. The principal states are given each a separate map, and the series, though rough in execution and printing, gives certain details not otherwise easy to come by.

'Central America.' By F. Palmer. (London: Laurie. *N.d.* Pp. xiv., 347. *Map and Illustrations.* 10*s.* 6*d.*) This writer has travelled through Guatemala, Salvador, Honduras, Nicaragua, and Costa Rica. While narrative and description make up a large and not uninteresting portion of the text, the author's particular interest appears to lie on the political side, and he deals authoritatively with the political conditions and prospects of the isthmus. The bibliography is a useful feature.

'The Ten Republics: An introduction to the South American Series in Porter's Progress of Nations.' By Robert P. Porter. (London: Routledge, 1911. *Sketch-maps.* 2*s.* 6*d.* net.) The Republics of Latin America are to be treated separately in the Progress of Nations Series. This volume is an introduction

to the ten in South America collectively. The object is to familiarize European, and especially British, readers with the commercial progress and possibilities of these nations. There is a chapter on the Panama canal, which the author has recently visited, and the vast importance of the approaching completion of this "greatest feat of engineering ever undertaken" is outlined. The writer thinks the United States will have the advantage, and capture the chief trade with Australasia and Japan.

'Argentine Year-book, 1910.' (London: W. H. Smith & Son. 1911. 10*s.* 6*d.* net.) The Argentine Republic celebrated its centenary in 1910, and although the year-book does not contain particulars of the celebrations, the information and statistics are specially interesting, as showing the wonderful progress made. The volume is divided into four sections, the first geographical and historical, with details and descriptions of each province and territory separately, the Official and General items, the Statistics of Commerce and Industry, and the Companies of the Republic as a whole, complete the list. Dairy and Forest industries, although comparatively new, showed marked development.

## AUSTRALASIA AND PACIFIC ISLANDS.

'Sunny Australia.' By A. Marshall. (London: Hodder & Stoughton. 1911. Pp. xii., 272. *Illustrations.* 6*s.*) This is the work of a special commissioner for a daily newspaper. The more solid matter of the book, therefore, lies on the social and economic side. But at the same time the writer, as Sir George Reid indicates in a prefatory note, "can make excellent word-pictures of scenes through which he passes," and the newspaper articles on which the book is based well deserve this more lasting method of preservation.

'Through South Westland.' By A. Maud Moreland. (London: Witherby. 1911. Pp. xviii., 221. *Map and Illustrations.* 7*s.* 6*d.*) The fascination of the Southern Alps of New Zealand is well known, though few have found it possible to realize it at first hand. This book points one way of doing so, and a pleasant way it seems to be under good conditions, though of the roughest at times. The book is well written and illustrated, and, beyond the incidents of travel, gives an idea of economic possibilities in this remote region.

'Papua.' By Rev. W. Charles Pritchard. (London: S.P.C.K. 1911. Pp. 96. *Map and Illustrations.* 1*s.* 6*d.*) The writer belonged to the staff of the Anglican mission in New Guinea, and has prepared a useful little handbook to the history, natives, physical features, and economic resources of the Territory of Papua. An appendix on health conditions is added by Dr. Fleming Jones, Government medical officer at Samarai.

'An Outpost in Papua.' By Rev. A. K. Chignell. (London: Smith, Elder. 1911. Pp. xii., 375. *Illustrations.* 10*s.* 6*d.*) This is an account of missionary work, written with a lightness of touch which is sometimes missing from such books. Moreover, it is more strictly personal and deals with topics more exclusively related to mission work, than other such works; its appeal may therefore be narrower, and yet those who study it will be rewarded with an intimate picture of life in Papua.

## PHYSICAL AND BIOLOGICAL GEOGRAPHY.

### Atmospheric Circulation.

Solar Physics Committee. 'Southern Hemisphere Surface Air Circulation: being a Study of the Mean Monthly Pressure Amplitudes, the Tracks of the Anticyclones

and Cyclones, and the Meteorological Records of General Antarctic Expeditions.' By William J. S. Lockyer. Under the direction of Sir Norman Lockyer. *Maps and Plates.* London: Wyman & Sons. 1910.

This is a valuable contribution to our knowledge of the general circulation of the atmosphere, and incidentally throws much light upon many different questions bearing upon dynamical meteorology. In a previous memoir, entitled 'A Discussion of Australian Meteorology,' noticed in this *Journal*, Dr. Lockyer has shown that Australian weather is governed by the passage of anticyclonic systems from west to east, and in the present memoir he attempts to prove the whilom assumption that there was a high-pressure belt of travelling anticyclones encircling the whole Earth about the latitude of Australia, a low-pressure belt of travelling cyclones farther south centred about 60° S., and a permanent centre of high pressure over the South Polar Continent. Owing to the scarcity of land in the southern hemisphere, the investigation has been more hampered through lack of observations than would have been the case had it been conducted in the northern hemisphere. Dr. Lockyer has confined the investigation to the six winter months, April to September, and has employed the values of the mean pressure amplitudes to aid him in locating the path of the anticyclones over the continents, islands, and oceans. An interesting inference from the trend of the lines of equal pressure amplitudes or isonakatabars is that mountain barriers like the Andes and the coastal range of Australia deflect the course of the anticyclonic systems southward, indicating that a travelling anticyclone, upon meeting such obstructions, possesses sufficient inertia not to be annihilated by them. In the scheme of atmospheric circulation here propounded by Dr. Lockyer's research, undertaken primarily with a view to ascertain what factors in the circulation would be most likely to be affected by the considerable variations in solar activity which are known to be taking place, the important question is raised by the author whether the anticyclonic and cyclonic systems should be regarded as fundamentally important guiding centres in the general circulation, or as merely eddies of secondary importance, set up by the main streams of warm and cold surface-air currents which flow respectively from equator to pole and pole to equator. The latter supposition seems the more reasonable one to hold, and is strongly supported by Dr. Shaw and Mr. Lemppert's work upon the trajectories of surface-air currents. These authors have arrived at the conclusion that the "surface-air currents belong rather to the type of circular motion controlled in direction by pressure difference than to the type of motion derived from the exhaustion of the potential energy of pressure difference," which means that anticyclonic centres are not conspicuously the sources of surface-air currents moving towards cyclonic centres, but are more properly inert isolated masses of air taking comparatively little part in the circulation which goes on around them, and that the moving air currents should be regarded as maintaining the centres of high and low pressure quite as truly as being maintained by them. We will add one strong piece of circumstantial evidence of our own in support of the contention that an anticyclonic is an inert lump in the general circulation, rather than a mainspring of action, and that is afforded by the temperature distribution in relation to wind-direction that prevails normally within such a system. When a well-marked anticyclone, for example, is centred over the British Isles in winter, it nearly always happens that the north-easterly winds on the south side of the system, blowing, say, in the south of England, have a lower temperature than the south-westerly winds on the northern side, blowing, say, in the north of Scotland. This is positive evidence that cold north-easterly and warm south-westerly currents blow more or less

independently from considerable distances along the fringe of the high-pressure system, and that they do not in the main flow radially outwards from the centre thereof.

L. C. W. B.

## GENERAL.

### The Classification of Man.

'L'Uomo.' By G. Sergi. Milan, Rome, Turin. Fratelli Bocca Editori. 1911. *Price* 20 *lire.*

Prof. Sergi has written an interesting work on anthropology, which will be widely read, and be of profitable reading, even to those—and there will be many—who cannot, on mature reflection, accept his theories, or all his theories.

Briefly, Prof. Sergi is ready not merely to divide ancient and modern types of Man into distinct *species*—a degree of divergence which most scientific anthropologists with a sound training in comparative anatomy will *not* allow (admitting only sub-specific differences)—but actually goes to the length now of dividing all known types of the human race, fossil and living, into five *genera*, with a further large division into distinct species and sub-species. In addition to this, he describes and criticizes too benevolently the wild theories of Prof. Ameghino (of Buenos Aires), theories which are based on very small scientific data, according to which there would have grown into existence (by a parallelism not unknown to Nature's proceedings) a kind of Man in Pliocene temperate South America, derived from an ascending branch of the American platyrrhine monkeys. He also admits Ameghino's discovery of a very ancient type of real "catarrhine" man in pampas formations, perhaps—but in regard to so many of these palæontological discoveries in America, the age of *emplacement* is but badly certificated—of early Pleistocene age.

Now, Prof. Ameghino—amongst biologists who should know better—is not alone in these heresies. Prof. Klaatsch—seemingly a savant of well-balanced mind—is going about Germany propounding the most impossible suggestions as to a multiple origin of the existing human race, this type coming direct from a gorilla-like ancestor, that from an orang, that from a gibbon, another from a chimpanzi, and so on. The plain man—the student who has read Duckworth and followed the lectures of Arthur Keith, of von Luschan, and of other great German anthropologists and biologists, and the leading authorities on human anatomy in Paris—is forced, if he pays any regard to the proper weighing of evidence, to recognize these fundamental truths about human classification: (1) With the exception of the calvarium of Pithecanthropos, there is no vestige of extinct human remains, and there is no known human race at the present day which cannot be brought easily within the limits of one genus —*Homo*. (2) All living men at the present day belong but to one species—*Homo sapiens*. Some of the earliest skulls of France and the Rhine valley and (?) Gibraltar may indicate an older, more simian, forerunner of the perfect man, and are sometimes styled *Homo primigenius;* but these remains are nevertheless emphatically human: the creatures of which they are vestiges could talk some kind of language, and had a brain development far above that of the anthropoid ape, and not inferior to that of present-day savages of Australoid or negroid type. (3) All existing human beings, savage or civilized, are perfectly fertile *inter se;* and, what is more, their offspring can in their turn interbreed, or breed quite freely with other human types. This is accepted as evidence of the *specific unity* of the existing human race. It is well known that animals of

distinct species, of distinct genus, sub-family, and even family (as among the gallinaceous birds) can interbreed and produce offspring, but this offspring is a mule, a monstrosity, an isolated sport, which cannot in its turn breed with anything.

Why do the great comparative anatomists of the day keep silence when such heretical nonsense is printed—more especially in North and South America, but also in Germany and Italy—concerning human origins and affinities? Why do they not make it clear, as Prof. W. L. Duckworth has done (in his 'Morphology and Anthropology'), that in all the elements and details of their anatomy—skulls, skeletons, muscles, organs, and viscera—all known types of human being are closely allied, and all alike are markedly distinct from the Old World Anthropoid apes, so that to find a common ancestor one must almost travel back to Pliocene Age? Yet, at the same time, why do they not assert our essential, though remote, kinship with the Old World *Simiidæ*, and our derivation from that stock, so as to put an end to the absurd theories ventilated in America about a double or triple origin of the human species.

Of course even the most nonsensical theory is based on a grain or two of truth, and the remains of American platyrrhine monkeys found fossil in the Argentine might really bear the interpretation that Nature, who has groped and fumbled after the creation of man, as she has similarly groped after the production of a single-toed herbivore, of a flying mammal, an aquatic carnivore, or a water-dwelling ungulate, made a faint attempt in South America, during the early Pliocene, to produce a man-like creature from a South American monkey. But such a thing as *Homunculus* or *Proanthropos* of Patagonia was but an extraordinary local development of the Platyrrhine monkey family, and had nothing to do with the true human ancestry.

Similarly, in Madagascar, before that island was colonized by real men of the Malayan race, Nature had been developing an extraordinary large-brained, erect, long-limbed lemur, which rapidly became extinct when brought into competition with the established lord of creation.

All the same, Prof. Sergi has written a most interesting book, and has brought together a wonderful assemblage of illustrations to illustrate divergent types of human skulls. Some of his photographs of prehistoric American skulls are most interesting, as they seem to show that both North and South America at some distant period harboured races with long skulls, prominent brow-ridges, or types which were prognathous, smooth-browed and negroid.

But the fact is that anthropology, from the point of view of comparative anatomy, is in its infancy. We want to know far more than we do at present about the muscles and viscera of the different living races, in addition to measurements of skulls and bones. And whilst we are waiting to get to work, the interesting primitive or divergent types of "unsuccessful" man are becoming extinct.

H. H. Johnston.

## Military Geography.

'The Outlines of Military Geography.' By Colonel A. C. MacDonnell, late Royal Engineers. London: H. Rees. 1911. 12*s.* 6*d. net.*

It seems strange that Colonel MacDonnell should adopt the exact title of the Cambridge University 'Outlines of Military Geography,' first issued in 1899, with a second issue recently; but nevertheless the gallant officer and his publisher deserve credit for trying to give British officers some knowledge of the causes which have determined the fate of nations in all ages.

Our author makes the singular statement that his early labours in military history and strategy were rendered "nebulous" because of his complete ignorance of military geography, although he passed the educational standards of the Royal Engineers. But surely he must admit that students of military geography will be perplexed when asked to become masters of strategic geography without first becoming familiar with the outlines of strategy! It is quite futile to dissociate these subjects, and his method accordingly was disappointing.

The author does not realize the importance of such subjects as the Caribbean centre of international strategy and the "New Pacific," in spite of its enormous potentialities, set forth lately by Baron Suyematsu and Lord Roberts, as well as by every naval strategist. It is also a pity that more care was not taken with the strategy of historic routes and lines of communication. We should not then be told that Napoleon brought all his troops over the Alps in 1800 by one pass, a movement which would have ensured his certain defeat by the Austrians! Improving on the strategy of Hannibal, Napoleon used the Riviera, the Cenis, and the Gothard, as well as the Great St. Bernard.

There is an atlas of nineteen maps, but some of them do not bear comparison with French or German productions of the same class. On the other hand, we find satisfactory references to the various new strategic canals and railways and sources of coal and oil supply. The writer deserves commiseration rather than reproof in being compelled to include the strategy of Africa, India, Asiatic Turkey, and Persia in about 6000 words; and this at a time when each presents problems of the utmost gravity to diplomatists, and which may lead to war at any moment! The descriptive chapters are hardly as instructive to soldiers as one could wish. The chapters on the Far East will not give much satisfaction to the anxious white races of the various Pacific coasts, and they leave the results of the Monroe doctrine and the strategy of Resurgent Russia in obscurity. The short summaries of waterways and "all-red" routes could not be other than concise, but they are to the point, although the careful student must look rather to Bancroft and Colquhoun's works for what our soldiers should regard as the minimum of information on these topics.

In any short "Outlines" there can be little reference to such details as the rivers of China, on which floats a tonnage in junks equal to all the mercantile marine of Europe, or to the 26,000 miles of navigable waterways in the great river systems of Northern India, which, if a navigable canal were to be run from the Jumna to the Sutlej valleys, would establish through water communication across the plains of India, between the Arabian sea and the Bay of Bengal. This would be a natural asset of the utmost value, commercial and military, especially in a period when coal, oil, and water are strategic necessities.

T. M. M.

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'Biblical Geography and History.' By C. F. Kent. (London: Smith, Elder. 1911. Pp. xviii., 296. *Maps.* 6*s.*) We find here the physical geography and the historical geography of the Holy Land worked out more fully than, on strictly geographical lines, is probably to be found elsewhere. The writer, an American authority, recognizes at the outset the place of geography in historical study, and he deals at length with surface and relief, studies the identification of a number of sites, devotes a most interesting chapter to "the great highways of the Biblical world," and finally works out along geographical lines the history from the earliest times down to the period of St. Paul's journeys. There is

a number of coloured maps for the portrayal of relief, routes, political divisions, etc., and these, though rather wooden in appearance, and sometimes printed without due regard to colour-register, are distinctly above the average standard of American cartography.

'Imperial Telegraphic Communication.' By C. Bright. (London: King. 1911. Pp. xi., 212. *Map.* 3*s.* 6*d.*) We have here an expert survey of existing imperial telegraphic communications, and a strong plea, fortified by careful schemes of reform, for reduced rates and extensions of the system. A general map, which might have been extremely useful, is unfortunately most indifferently reproduced.

'The Story of the British Navy.' By E. Keble Chatterton. (London: Mills & Boon. 1911. Pp. xiv., 371. *Charts and Illustrations.* 10*s.* 6*d.*) This book deserves a wide circulation. It is beautifully produced and illustrated, and it is written with a judicious appeal to patriotism, which is never allowed to become hysterical. In the course of the history, many of the greatest sea-fights are discussed critically and in high detail. There is a bibliography of considerable length.

'Britain on and beyond the Sea.' By C. H. Crofts. (Edinburgh: Johnston. Pp. xiv., 168. 1*s.* 6*d.*) The fact that this little work has reached a sixth edition is sufficient evidence of its favour. Including as it does a brief survey of the British dominions beyond the seas, it makes an appeal to the geographical teacher who wishes to combine British naval history with his special subject.

'The Student's Lyell.' By Dr. J. W. Judd. (Second edition.) (London: Murray. 1911. Pp. [56], 645. *Illustrations.* 7*s.* 6*d.*) This second edition, revised and enlarged, needs no introduction to the physical geographer, who can hardly fail to be familiar with a number of its chapters. Some of its illustrations are becoming a little old-fashioned, but the book is a model of good arrangement and production.

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## THE MONTHLY RECORD.

### EUROPE.

**The Scottish Peat Mosses as Clues to Past Changes of Climate.**—We have already referred more than once to the investigations by Mr. F. J. Lewis in regard to the Scottish peat mosses and their various strata of plant-remains, undertaken with a view to throwing light on the sequence of events in this part of Great Britain since the close of the Glacial epoch (see *Journal*, vol. **27**, p. 84; vol. **30**, p. 88; vol. **31**, p. 331). Mr. Lewis has since continued his researches in the field in order to complete the data on which to base his final conclusions, and has put forward the results in a fourth paper, published in the *Transactions* of the Royal Society of Edinburgh, vol. **47**, part iv., 1911. The area to which the chief attention was directed during the later researches was that of the Shetland islands, but further examination of peat-mosses in Rossshire, East Sutherlandshire, and elsewhere were also made. The result has been fully to confirm the accuracy of the general conclusions based on the earlier work, and show that, in the peat-covered areas of Scotland, the following stages in the history of the vegetation since the later stages of the Glacial period may be traced: (1) An Arctic-alpine vegetation resting on the moraine laid down by the last *mer de glace;* (2) a forest of birch and hazel; (3) a layer

of Arctic-alpine plants, occurring down to sea-level in Shetland; (4) a forest of pine, hazel, and birch occurring up to 3200 feet; (5) a layer of peat accumulated from the close of stage 4 to the present day, consisting entirely of moorland plants. This broad succession has been found to hold good even in Shetland, the only important difference being that the upper forest is there wanting, though the lower forest is well developed and occurs far beyond the present tree-limit. In Sutherlandshire the upper forest was also found. Mr. Lewis devotes much attention to the problems suggested by these facts, especially to the question whether the forest beds can be correlated in time over the whole area (as held by Blytt and Sernander), or whether (as has lately been maintained by Gunnar Andersson) the tree roots are associated, in different areas, with all the phases of the post-glacial period. It is held that in Scotland, at least, the forest-beds do occupy distinct horizons, a strong argument in the case of the lower forest being the uniform and consistent relation which it bears to the Arctic beds above and below. This indicates that, like the latter, it represents a distinct climatic phase in early post-Glacial time. There seems no reason, however, to associate the forest beds with specially dry periods, as has been done by Blytt. So far as temperature was concerned, the conditions during the lower forest stage were probably not very different from the present; but in the Shetlands at least the conditions must have differed in other ways, probably in a greater freedom from strong salt-laden winds, to which the absence of forest at the present day seems especially to be due. The upper forest may possibly represent merely a variation of ecological conditions, but if so it is difficult to account for the existence of this bed so far above the present tree-limit. In speaking of Shetland, Mr. Lewis treats incidentally of the denudation of the peat at the present day, in which, he says, wind plays a prominent part. The early stages, during which the close covering of mosses, Calluna, and Ericas is first broken, are somewhat obscure, though when a bare hollow is once formed, the peat is rapidly disintegrated and carried away by frost, wind, and rain. The channels thus formed may vary from 8 and 10 feet in depth to a couple of inches only, according to age. Mr. Lewis found that denudation was apparently most active below a certain level.

**Study of a Norwegian River.**—A recent monograph * of the Norwegian Department for the investigation of rivers deals with the Numedalslaag, which flows into the Larvik fiord after a course of 217 miles. Its drainage basin of 2190 square miles is narrow compared to its length, not exceeding in the lower two-thirds, where the river runs from north-west to south-east, 15 miles, and the transverse valleys are consequently insignificant. The rocks over most of the basin consist of hard quartzose varieties. In the north-west, on the Hardanger plateau, they are almost exclusively granite. In a few places there are small exposures of slates, and a little below Kongsberg there is a strip of Silurian slates and sandstones. The author describes cursorily the physical geography of the river-basin, but, as is natural considering the post he occupies, he devotes most attention to the economical capabilities of the river as a source of power, which is as yet little developed, and as a channel for the floating down of timber, in connection with which the rainfall and discharge are of great importance. In the lower part of the river salmon fishing is an important industry. The fish can ascend the river for 40 miles, to the Avittingfos, and in good years the catch is worth more than £2200.

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* 'Beskrivelse av Numedalslaagen.' Utgit av Vasdragsdirectøren. Kristiania: H. Aschehoug & Co. Pp. 289. *Maps and Illustrations.*

## ASIA.

**Dr. Musil's Journey in the Northern Hejaz.**—A year ago (vol. 36, p. 612) we gave some particulars of Dr. Musil's journey of 1910, between the Hejaz railway and the Red sea. We have lately received from the traveller a preliminary report on the journey, made by him to the Vienna Academy of Sciences (*Anzeiger, phil.-hist. Klasse*, May 17, 1911), which, with the help of the sketch-map appended, affords more precise details of the route followed. From his starting-point at Maan, Dr. Musil had hoped to go east to the castle of Kelwa and the important watering-place Al Hausa, and to proceed thence to Teima for the purpose of archæological research; but the disturbed state of the country made this impossible. He therefore took a route to the south-west to the head of the Gulf of Akaba, first tracing the southern watershed of the Al Jafar basin—an east-and-west line of heights which drops steeply southward to the great plain of Al Hesma, with its numerous isolated cones and ridges. Towards the west the route crossed an ancient road leading from Syria to Medina, in the neighbourhood of which artificial reservoirs were seen. Later, after other traces of the Roman occupation had been passed, indications were found, near the well of Al Beza, of the Roman road connecting Syria with the Red sea, while the ruins of the great Nabatæan city of Al Homeima were examined. Near the head of the Gulf of Akaba clear indications were seen of the former greater extension of the Red sea. The coast was left again at Al Hmeza, and a barren Alpine region with high granite mountains and broad deep valleys was entered. Marching down the depressed valley of Al Abjas—Efal, parallel to the Gulf of Akaba, and passing the ruins of Haura, Dr. Musil reached the Red sea proper at Al Hraibe. This part of Arabia is spoken of as capable of extensive colonization, and as one of the most favoured districts of the Turkish Empire. The Turks are little liked, but great interest is shown in the English rule in Egypt, with which country close relations are maintained. Going east once more, *en route* for Tebuk, Dr. Musil left the Tihama and reached a region cut by valleys with sheer granite walls. The ascent by the Sik pass to the Ash Shefa plateau was exceptionally difficult and dangerous. After crossing a slightly undulating plain, overtopped by rocks of the most diverse forms, the Harra was seen rising like a gigantic wall to the south. At Tebuk no account was taken of the traveller's recommendations from Constantinople, and he was forced to leave by stealth. Going south-east, he crossed the plain of Az Zawije, already belonging to the basin of the Red sea, to which passes lead down between the huge granite peaks of Dabbar, Harb, Jaula, etc. Having visited the ruins at Rwafa, and finding it impossible to continue south-west to the Tihama, he went south-east over an absolutely barren country (in part lava-covered), no useful rain having fallen for several years. Striking an ancient road flanked by round towers, he reached the great mountain Sejban, and found many parties of Atawne encamped with their camels. Great complaints were here made against the railway, which has caused a rise in the price of grain. In the well-watered valley of Al Jizel, Dr. Musil and his companions met with treacherous treatment at the hands of the Beli Freat, and barely escaped with their lives. Turning north-east towards the railway, they came upon the mountain which Dr. Musil identifies with the Biblical Sinai—the volcano Al Bedr, regarded as sacred by the inhabitants, and apparently connected with Moses by tradition. The return to Tebuk along the railway (the state of which, as of the garrisons along it, Dr. Musil severely criticizes) was effected under great difficulties.

**Dr. and Mrs. Workman's latest Himalayan Expedition.**—Dr. W. Hunter Workman writes to us stating that he and Mrs. Bullock Workman

recently returned to India from their seventh Himalayan expedition, having devoted their attention this time to the Eastern Karakoram. During the summer of 1911 they explored the mountain and glacier region south of the Baltoro glacier, between the latter and the Shyok and Saltoro valleys, from the Kondus-Siachen water-parting on the east, to the western barriers of the glaciers tributary to the Hushe river on the west, including the Dong Dong, Ser-pi-gang, Kondus, Chogo Lisa, Kondokoro, Masherbrum, and Alin glaciers. No traces of any of the passes reputed to exist between this region and the Baltoro could be found, all glacier-reservoirs being enclosed by high, very abrupt and unscalable rock walls, and many of the upper portions of the glaciers being so steep and broken into séracs as to be inaccessible. After the exploration of the region directly south of the Baltoro had been concluded, the Bilapho glacier was ascended, the ice-covered pass at its head, about 18,550 feet above sea-level (as calculated from boiling-point readings compared with simultaneous ones at the meteorological station of Skardo), crossed, and the descent to the Siachen glacier made, where, although the season was advanced, the party remained four weeks. This glacier, the largest valley glacier in Asia yet discovered, is probably 50 miles, if not more, in length.* Its upper half is very complicated in its topography, drains an immense area, and is fed by seven large branches nearly as wide as the main stream, of which one, ascended by the party, is more than 25 miles long, and leads to a great snow plateau lying at and above an altitude of 19,000 feet. Besides the large branches, innumerable smaller ones descend to the glacier from the mountain-walls enclosing it. The highest mountains lie along the western side of the glacier, a number rising in separate peaks or massifs of great size. The most impressive of these is $K_2$, with its two summits of 25,210 and 25,415 feet, marked on the Survey map as two separate peaks, which dominates not only the Siachen, but also the Dong Dong and upper part of the Bilapho glacier. Among other high points attained was a sharp peak of 21,000 feet, commanding an extensive view of the Siachen from its upper to its lower portion, and of its wonderful mountain entourage. The Siachen side of $K_2$ was also ascended to a height of 20,000 feet, to the base of the perpendicular precipice which rises thence to the lower summit. Above this height the mountain appears to be inaccessible on all sides. Three elevations on the high north-eastern wall of the glacier near the junction of the great eastern branch with the main stream, one of which was named Teram Kangri by Dr. T. G. Longstaff, were triangulated with the theodolite by Dr. Calciate. Although his final calculations have not yet been worked out, the preliminary figures indicate an altitude for the highest of these more than 3000 feet less than that obtained by Dr. Longstaff in his measurement of Teram Kangri, placing it at not far from 24,000 feet. It is understood that these three points have also recently been triangulated by the Indian Survey from stations to the south. When the final figures are given out, it will be interesting to see how the results of the three measurements compare with one another. Owing to the lateness of the season the cold was rather trying, especially when the wind was strong. At 16,000 feet a temperature as low as 5° Fahr. was recorded on three occasions. Considerable new material, geographical, physiographical, and glaciological, was gathered, and, as the weather was fine a good part of the time, a large collection of photographs, panoramas, and telephotographs was secured. This

* Dr. Longstaff's visits to this glacier in 1909 were described in the *Journal* for June, 1910.

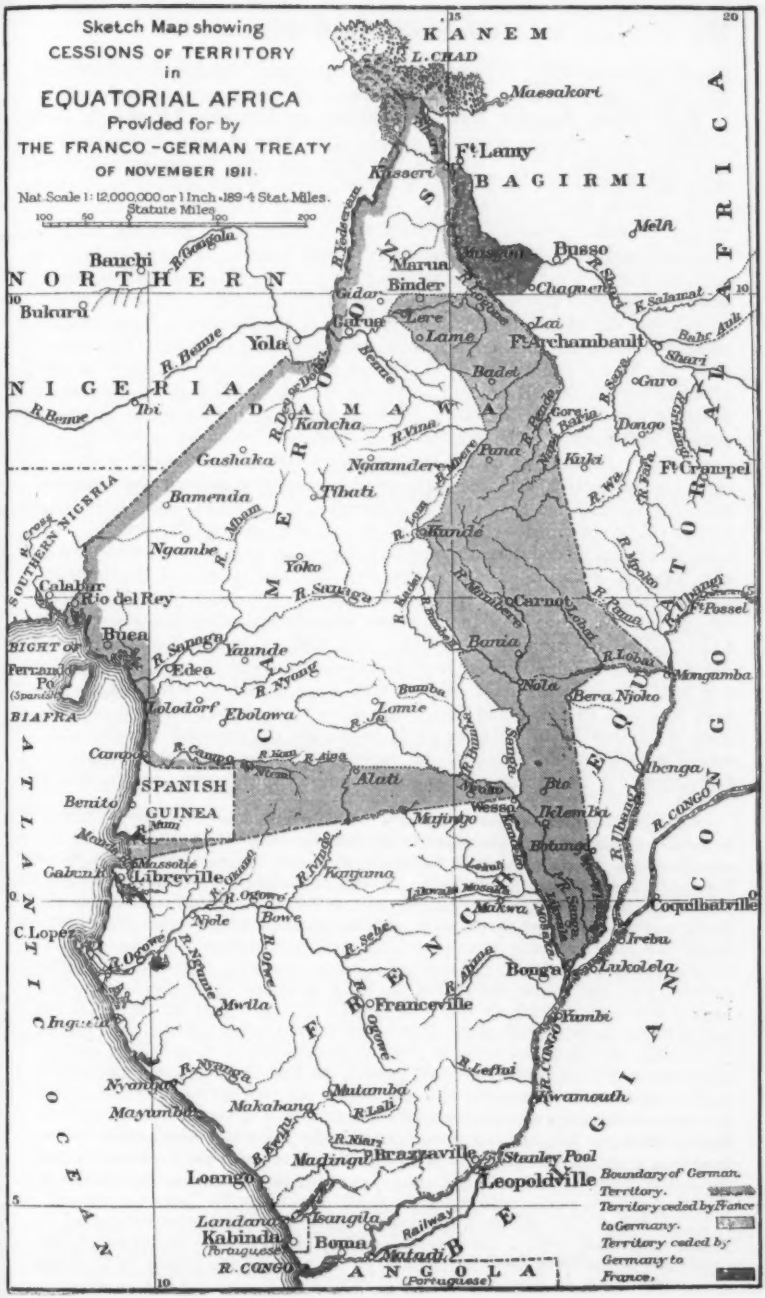
glacier is by no means an easy one to explore, on account of its inaccessibility, its distance from any available base of supplies, the absence for the greater part of its course of wood and even of camping-places on the sheer rock and ice-bound mountains that rise from it, and from the configuration of its surface, cut up by rivers and ravines and broken into seracs and high hillocks.

## AFRICA.

**M. Montandon's Journey in Southern Abyssinia.**—An exploring journey has lately been completed in Southern Abyssinia by a young Swiss traveller, M. Montandon, who has brought back a considerable amount of new information from the little-known country west of Kaffa. The particular district chosen by him as the scene of his researches was that of Gimirra, traversed rapidly by Dr. Oscar Neumann in his journey described in the *Journal* for October, 1902, but not hitherto subjected to a detailed examination. M. Montandon sailed from Marseilles in October, 1909, and began the serious part of his task on setting out from Addis Ababa on March 1, 1910. The route led south-west through the province of Jimma, surveys being commenced on reaching Jiren, its capital. After crossing the Gojeb into Kaffa, the traveller struck an important river named Wosho, possibly an independent tributary of the Omo, and entering Gimirra, traversed the whole country from east to west. It is watered by the headstreams of the Gelo. A trip was made across the desert at the western foot of the plateau to the Akobo, after which the return was begun by a more northern route, leading through the forest of Mosha to Gore, and thence through Bunno, Guma, etc., to Jimma. Besides the survey, observations of the physical geography, ethnology, linguistics, etc., of the region traversed were secured. We hope to publish shortly a narrative of the journey which has been promised by M. Montandon.

**Franco-German Territorial Arrangement.**—The accompanying map shows the exchange of territory effected between the Kamerun and French Equatorial Africa as a result of the treaty signed on November 4. As a compensation for the final recognition by Germany of French political supremacy in Morocco, a large area of French territory has, it will be seen, been ceded to Germany, while as a partial set-off a much smaller area, forming part of what has been known popularly as the "Duck's bill" of the Kamerun —the eastward extension between the Logone and the Shari—is ceded by Germany to France. More important than the acquisition of so much additional territory by Germany is the access thus obtained by her to the important waterways of the Ubangi and middle Congo—to secure which has been a principal motive in the German claim for rearrangement of frontiers. The new frontier appears a complicated and unnatural one, and the two tongues of German territory projecting into the heart of the formerly compact French possession practically cut off the French communication from the west coast to Lake Chad, except through German territory. The right to hold stations along a route through this is, however, conceded by Germany.* On the other hand, the possession of the tract between the Logone and Shari will no doubt be of some value for the development for the more northern part of French Equatorial Africa. A careful computation gives the area of the territory ceded by France to Germany as 107,270 square miles, and of that ceded by Germany to

* The islands in the Congo and Mobangi opposite the extremities of the German strips remain in the hands of France.


Sketch Map showing
CESSIONS OF TERRITORY
in
EQUATORIAL AFRICA
Provided for by
THE FRANCO-GERMAN TREATY
OF NOVEMBER 1911.
Nat. Scale 1: 12,000,000 or 1 Inch = 189·4 Stat. Miles.
Statute Miles
100 50 0 100 200
KANEM
L. CHAD
Massakori
Ft Lamy
BAGIRMI
Kusseri
Mela
Busso
Chagueni
Maroua
Binder
Gidar
Garua
Lere
Lame
Lai
Ft Archambault
Bauchi
NORTHERN
NIGERIA
Bukuru
Yola
R. Benue
Ibi
ADAMAWA
Kaincha
Badei
Gashaka
Ngaoundere
Tibati
Bamenda
Ngambe
Yoko
Calabar
Rio del Rey
Buea
BIGHT OF
Fernando Po
(Spanish)
BIAFRA
Edea
Yaunde
Lolodorf
Ebolowa
Lamie
SPANISH
GUINEA
Benito
Libreville
Galoa
C. Lopez
Njole
Bowe
Mwila
Franceville
Inguedi
Nyanga
Mayumba
Makabana
Mutamba
Madingo
Brazzaville
Stanley Pool
Leopoldville
Loango
Landana
(Portuguese)
Kabinda
(Portuguese)
Boma
Matadi
R. CONGO
ANGOLA
(Portuguese)
Railway
Kandé
Carnot
Bania
Nola
Bera
Njoko
Mongamba
Possel
Ft Crampel
Kaiki
Dango
Garo
Shari
Ft Archambault
Coquilhatville
Ireba
Lukolela
Bonga
Bumba
Lisala
Ibenga
Bikelemba
Bolungo
Wesso
Majunjo
Alati
Kangama
Makwa
Hambi
Iwamouth
Boundary of German Territory.
Territory ceded by France to Germany.
Territory ceded by Germany to France.

France as about 6450.* The population of the former area has been estimated at between 1,000,000 and 1,200,000, but this is, of course, only approximate.

**Prof. Hans Meyer's New Expedition to Central Africa.**—A new expedition for scientific research in the region west of the Victoria Nyanza, including Ruanda and the Kirunga volcanoes, has been undertaken by Prof. Hans Meyer, who has reported on the first results of the journey in a letter dated July 22, 1911, printed in the latest issue of the *Mitteilungen aus den Deutschen Schutzgebieten* (1911, Heft 4). Various pieces of work of geographical interest had already been done. From Bukoba the traveller (who is accompanied by Lieut. Tiller as topographer, and Dr. Houy as medical officer and zoologist) went first to Lake Ikimba, where the dry season was in full swing, though rain had been experienced on the step of the plateau next the Victoria lake. Following the southern and south-western side of Ikimba by the caravan road, Dr. Meyer found that its shape had altered considerably since it was surveyed by Captain Herrmann (*Journal*, vol. **14**, p. 321). The open water stretches a good deal farther west, and a swampy tract not shown on the maps extends still farther. The lake water is fresh, and its outlet is said to flow north-west. Ikimba lies at the foot of the eastern plateau, which ends in a steep regular wall 700–800 feet high, running along the eastern and southern shores of the lake and then striking southward to the south-east side of Lake Burigi (Urigi of previous travellers), which was afterwards visited. This escarpment has its counterpart some 20 miles to the west, in the escarpment of the Karagwe plateau. Between the two lies the sunk-land of Ihangiro, an undulating bush-covered wilderness, in which the lakes above-mentioned occupy hollows. Five days' march across this wilderness brought the party to Lake Burigi, no running water being met with *en route*. Some time was devoted to an examination of Burigi, the surroundings of which are formed by low hills covered with grass, or grass with a sprinkling of trees; not, as has been supposed, by forest-clad hills. Soundings showed that the lake occupies quite a shallow basin. Hippopotami haunt the papyrus-clad margin, while crocodiles are absent. Bird-life is varied, but without great numbers of individuals. A broad papyrus swamp connects Burigi with the valley of

* The new frontier, or that of the area ceded by France to Germany, is defined as follows: Starting from the Atlantic on the east shore of Monda bay near the mouth of the Massolie, it runs diagonally north-east to the south-east angle of Spanish Guinea. Thence it runs to the junction of the Ivondo [Ivindo] with the Jua, and follows the latter to Majingo (which remains French). It then runs east to the junction of the Ngoko and Sanga, north of Weso, leaving the Sanga again south of the latter place (which remains French), and at a distance from it not less than 6 or more than 12 kilometres. Bending south-west, it follows the valley of the Kandeko to its junction with the Bokiba, descending the latter river and the Sanga to the right bank of the Congo. It follows this for a distance of from 6 to 12 kilometres, to the mouth of the Sanga, ascending the latter to the Reedy Likuala, which it then follows to Botungo. It then goes north in a nearly straight line to Bera Ngoko, bending then towards the junction of the Bodinga with the Lobai, which last it descends to the Ubangi north of Mongumba. On the Ubangi the German territory will extend for not less than 6 or more than 12 kilometres, according to the local features. The frontier then runs diagonally north-west, striking the Pama at a point to be hereafter fixed west of the confluence of the Mbi; ascends the valley of the Pama and strikes the eastern Logone [the Pende of Lenfant] at about the spot where this river cuts the 8th parallel in the latitude of Gore. It will then follow the Logone northwards to its confluence with the Shari. A separate article describes the territory ceded to France as the area north of the present boundary of the French possessions in the Lake Chad region, lying between the Shari on the east and the Logone on the west.

the Muisha (Ngoma of the maps), which occupies a trench at the foot of the western wall. The ascent of this was effected with considerable difficulty after the much-dissected but waterless plateau of Northern Usuwi had been crossed. After passing the small Lake Rugasha (a backwater of the Kagera, as Burigi is of the Muisha) the party crossed the Kagera—a troublesome business—and passed through eastern Ruanda to the Government station at Kigali. This almost treeless country is an original plateau dissected by erosion into long regular ridges divided by swampy valleys. An interesting discovery was that of a new lake, called by the natives Kihonda, or Kihonde, which stretches from east to west across the floor of a chaldron-shaped depression 12 miles wide, sunk some 1000 feet or more below the surface of the plateau, but apparently opening northwards into the flats of the Kagera, where indistinct views of water-expanses were also gained. The lake has many bays and islands. Extensive geological collections had been secured, and a survey of the route carried out, though the thickness of the atmosphere, due to the grass burnings, had for the greater part of the way prevented the use of the photographic method.

## AMERICA.

**Professors Tarr and Martin in Alaska.**—In the *Geographical Journal* for October, and generally in Associated Press despatches in the United States, it has been stated that a Smithsonian expedition for the study of glaciers had lost all the field notes and photographic results of the season's work. It has since transpired that the report had reference to the National Geographic Society expedition under the direction of Professors R. S. Tarr and Lawrence Martin (see *Journal*, vol. **37**, p. 667). No photographic negatives were lost, though most unfortunately one of the note-books containing Prof. Tarr's data on a month's work, the first of the season, was swept away. The upset of the conveyance took place, not in the Yukon, but in a glacial stream in the Delta river pass across the Alaska range. Word has just come of the recovery by some soldiers of a rücksack containing a camera, field-glasses, railway tickets, etc., so that a second camera and the notebook are the only things still missing, and even these may be recovered in the low-water stage of the autumn. This third of the research expeditions of the National Geographic Society saw something of conditions of present glaciers and past glaciation (*a*) in the Kenai peninsula near Seward and the Alaska Northern Railway, (*b*) along the Copper river and North-Western Railway near Mount Wrangell and near Childs and Miles glaciers, (*c*) along the White Pass and Yukon Railway from Whitehorse to Skagway, and (*d*) in south-eastern Alaska near Lynn canal, Glacier bay, Taku inlet, and the Stikine river. General glaciation was also studied in the Copper river and Tanana valleys and the upper Yukon river, and Pleistocene physiography along the middle Yukon, as at Dawson in Klondike and Fairbanks, Tanana, Rampart, Circle, Fort Yukon, and Eagle in the driftless portion of Alaska. The party travelled 1200 miles up the Yukon river by steamer, and made the first summer journey ever attempted from the coast at Cordova by rail to Chitina, and thence 320 miles across Central Alaska in a buckboard, to Fairbanks. There is a winter mail trail here, and it has been traversed with pack-horses in summer, but never before as a whole with a wheeled vehicle. The Alaska road commission and the stage company has each made one summer waggon journey from Valdez to Fairbanks, but the National Geographic Society party made the first waggon trip across the Chugach and Alaska ranges, and through the Copper and Tanana valleys from Cordova to Fairbanks. Results of this four months' work during the summer of 1911 will be published by the National Geographic Society of Washington.

**Mr. Stefánsson and Dr. Anderson in the extreme North of Canada.**—Both of the former companions of Mikkelson on his expedition to the Beaufort sea, Mr. Leffingwell and Mr. Stefánsson, have since continued their scientific work in the Arctic region of North America. We have already referred (*Journal*, vol. **33**, p. 215; **36**, p. 615) to Mr. Leffingwell's journeys, and we are now able to give some account of those of Mr. Stefánsson (and his companion Dr. Anderson), from letters from the former published in the October number of the *Bulletin* of the American Geographical Society. The region in which these travellers have been engaged for over three years is that between the Coppermine river, Great Bear lake, and the shores of the Arctic ocean, in great part hitherto unexplored ground; and new geographical as well as ethnological information has been obtained. The accounts of previous travellers—Franklin, Richardson, and Rae—had led Mr. Stefánsson to think that no natives would be found over a large part of the area, but this idea proved erroneous. House-ruins were found here and there from Cape Lyon to Inman river, while Eskimo camps were found all over the area between Great Bear lake and the Coppermine. On the coast, too, settlements were found west of Cape Krusenstern, none of whose inhabitants had ever seen a white man. On the south coast of Victoria island, north of Cape Bexley, a discovery was made which has attracted a good deal of public attention—that of light-coloured people who from their appearance would have been pronounced three-quarters Europeans rather than Eskimo. They present a remarkable problem, and Mr. Stefánsson hints at the possibility that they may be descendants either of some of the lost members of Franklin's expedition, or of the Icelandic Scandinavians who disappeared from Greenland in the fifteenth century. A geographical discovery is that of the course of the Horton river, between Great Bear lake and the Arctic coast, the mouth of which only was laid down by Franklin on his second overland expedition. In the region in question two rivers, the La Roncière and McFarlane, have hitherto appeared on the map, but their supposed courses are crossed and recrossed by that of the Horton, which gave the impression of being a larger river than the Coppermine. It is swift, but with no bad rapids, and there is plenty of spruce in the valley proper to within 50 miles of the mouth. Coming to the river by a north-west course from Great Bear lake, trees are reached in 55 miles after traversing a belt of barren ground 18 to 20 miles wide. The valley shows outcrops of cystalline limestone almost everywhere, and there are cañons in this rock up to 200 feet high. Dr. Anderson, whose journeys were made in part independently, reports having secured a number of natural history specimens. The explorers suffered a good deal of hardship, as their method was to live on such supplies as the country afforded, and the food-supply was often a matter of difficulty owing to the recent great diminution in the numbers of caribou.

**Frost in the United States in Relation to Crops.**—Bulletin V. of the U.S. Weather Bureau (1911) constitutes a discussion by P. C. Day, with maps, of the length of the crop-growing season in various parts of the Union as determined from the average of the latest and earliest dates of "killing" frost. The importance of frost statistics is emphasized, inasmuch as in practically all portions of the United States agricultural products are menaced by frost at some period of their growth, and a knowledge of the subject makes it possible to extend, through modern devices of protection of crops from frost, the area of profitable cultivation of many classes of products. A chart showing the average length of the crop-growing season as defined above shows, of course, great variations according to latitudinal range, and also con-

siderable variations caused by local features, such as the Rockies and the Great Lakes. The influence of such large bodies of water as the Great Lakes is seen to extend greatly the period of immunity from severe frost. It is found that in the arid regions where the diurnal variations of temperature are great, plants become more hardy, and less liable to sustain injury from frost than in the more humid regions. In the complicated topographical conditions among the mountains it is important to ascertain what slopes are suitable or otherwise as sites for orchards, according to their influence upon air-drainage.

**The Climate of Porto Rico.**—Dr. Oliver L. Fassig has made an interesting discussion of climatological data for Porto Rico upon the basis of observations established since 1899 by the United States Weather Bureau, such as suggest good evidence of the benefits in a single sphere of activity which have no doubt accrued to the island since it passed from Spanish to American rule. Porto Rico, situated in the Trade wind region, between 18° and 19° N., is for the most part mountainous in the interior, but the elevations are nowhere greater than 3500 feet, or about that of Snowdon. The scenery of the island is beautiful, the agricultural productivity great, and the climate decidedly salubrious, despite its situation within the tropics. The mean annual temperature, combining the records from all stations, high and low, is 76° Fahr. The mean daily range is, as usual in the tropics, more pronounced than the mean annual range. Only on three occasions in the past ten years has a temperature exceeding 100° Fahr. been recorded at any of the forty odd stations on the island, the maximum being 103° at San Lorenzo in August, 1906. The relative humidity of the air in virtue of insular position near the equatorial belt is naturally high, but the enervating effects of damp heat are much minimized by the steady flow of the north-east Trade, which only fails occasionally for a few days. The climate is sunny, but the rainfall is heavy, averaging for the whole island 77 inches, with a variation from 94 in 1901 to 64 in 1907. The precipitation on the north side of the central dividing range of mountains is very heavy and constant, but irrigation projects for the south coast will in great measure overcome the disadvantages of an insufficient and irregular rainfall. There are no well-defined wet and dry seasons in Port Rico. The rains, though usually of short duration, are frequently very heavy. Falls of 4 to 5 inches in twenty-four hours are very common, whilst in heavy storms the amounts are enormously greater than this. On September 6–7 of 1910, Naguabo recorded 19 inches in twelve hours, whilst at Adjuntas, during the hurricane of August, 1899, 23 inches fell in twenty-three hours. Despite these occasional huge falls of rain, associated sometimes with cyclonic storms, to which type the destructive West India hurricane belongs, Port Rico is comparatively free from storms of all kinds, and the weather conditions, as is so often the case in the tropics, tend to become tame and monotonous. Thunderstorms of a mild nature are said by Dr. Fassig often to accompany the frequent showers, but to lack the formidable intensity and awe-inspiring character of those which occur at midsummer in the United States, or, we might add, in England.

**Dr. Fritz Krause's Journey to the Araguaya River, Brazil.**—The middle basin of the Araguaya river, the great western branch of the Tocantins, is still imperfectly known, and is inhabited by tribes, some of which have hardly yet come in contact with Europeans. In 1908, Dr. Fritz Krause undertook a journey of ethnological research to this region on behalf of the Leipzig Museum, and a brief account of his experiences is given in the *Revista* of the Brazilian Historical and Geographical Institute, vol. 73, part i., 1911. Dr. Krause started overland from Rio, travelling *vid* Goyaz to Leopoldina, which

he reached on May 31. After much difficulty he procured boats and men for the navigation of the Araguaya, down which he started on June 8, the river being low at the time. The first tribe met with and studied was that of the Carajas, who made a very favourable impression, being described as a light-hearted and simple folk, with a social organization and moral principles which place them on a high level of culture. Dr. Krause visited all their settlements, and gained an intimate acquaintance with their mode of life. It proved impossible to visit the Javaes, who inhabit the interior of Bananal island, on the outward journey, and the travellers proceeded to Conceição, on the frontier between Goyaz and Para, which has been claimed by both states, though now belonging to Goyaz. Founded in 1896 only, its population already reaches six to seven thousands, mostly occupied in rubber-collecting between the Araguaya and the Xingu. Parties at work in this district had just come in contact with others working from the side of the Xingu, a somewhat disturbing occurrence, as it meant that no more virgin ground remained to be explored in that direction. An idea had been entertained of opening a route by the Rio Fresco to the Xingu, so as to avoid the difficulties of navigation on the lower Araguaya and the Tocantins, but this was given up in favour of a route by the Rio Inajas to Leopoldina, the opening of which would, it was thought, give a much-needed impetus to the development of the latter. After an excursion to a settlement of the Cayapos, who have only lately been brought into friendly relations with the colonists, and were still timid and reserved, Dr. Krause completed his preparations for the return voyage, which was begun on August 3. Reaching the northern end of Bananal island, he found that the eastern branch of the river, by which he had hoped to reach the Javaes, had nearly dried up owing to the long-continued drought. He therefore decided to ascend the Tapirape, a hitherto unexplored western tributary of the Araguaya. This was done under great difficulties, the river being extremely low and having a very winding course. Its banks were quite uninhabited, and though traces of the presence of the Tapirapes, a practically unknown tribe of Indians, were at last met with, and overland trips were made in the direction of the Xingu, no representatives of the tribe were encountered. The river abounds in fish, and seems to be visited periodically both by the Tapirapes and Carajas. Mosquitos are a veritable scourge along its course. Dr. Krause afterwards made an overland trip into the centre of Bananal island, and, thanks to the good offices of his friends the Carajas, succeeded for the first time in opening friendly intercourse with the Javaes. The journey was then continued to Leopoldina and Goyaz.

### POLAR REGIONS.

**Antarctic Expeditions.**—An urgent appeal to the public, signed by Sir Archibald Geikie, Sir Clements Markham, and other members of Captain Scott's Committee, has been issued asking for further funds in order to make good the unexpected expenses incurred owing to the damage to the *Terra Nova* on the outward voyage, and to provide the means of continuing the work of the expedition for another year, if necessary. It is calculated that £15,000 will be needed, and stress is laid on the desirability of raising this sum before the sailing of the *Terra Nova* on December 1. A promise of £1000 towards the new fund has been made by the Council of the Society. Subscriptions may be sent to the Treasurer, Sir Edgar Speyer, at 7, Lothbury, E.C. The German Expedition under Lieut. Filchner left Montevideo for the South on October 6, and was expected to reach South Georgia about the middle of November, after carrying out hydrographical work on the way. Lastly, it is announced from

Sydney that the Japanese Expedition, under Lieut. Shirase, which early in the year made an unsuccessful attempt to reach the Antarctic continent with a view to a dash to the pole, has started once more with a larger company, and in every way better equipped for its task.

## MATHEMATICAL AND PHYSICAL GEOGRAPHY.

**Earthquake in South Germany.**—An earthquake of some severity was felt throughout Wurtemberg, Bavaria, and Switzerland, and over large parts of France and Italy at about 9.25 p.m. on November 16. So far as is known, it was unattended by loss of life, but some damage to property occurred over a wide area, at places as far apart as Constance, Stuttgart, Freiburg, and Mulhausen. The shock was felt as far as Dresden to the north-east, and Milan to the south, so that the disturbed area must have been considerable. The details at present known are insufficient to determine the position of the epicentre, but it was probably not far from Donaueschingen, a district in which earthquakes of a moderate degree of intensity are by no means uncommon.

## GENERAL.

**Early Manuscript Maps in the Paris National Library.**—Dr. K. Kretschmer has lately examined a number of the manuscript maps, mostly of the sixteenth century, preserved in the Paris National Library, many of which had not previously been described, or had been so briefly described by other writers as to be very little known to students. He has done a service to the latter by giving a careful description of each map and atlas examined, in the *Zeitschrift* of the Berlin Geographical Society, 1911, Nos. 6 and 7. Dr. Kretschmer as a rule contents himself with simply enumerating and describing the maps, and in the cases where no author's name appears, makes no attempt to solve the question of authorship, or to draw comparisons with other cartographical works of the period, which would have enhanced the value of the study. His statement that none of the maps have been fully described before is not entirely correct, for curiously enough the first in his list is the Portuguese atlas treated of in full detail by Dr. J. Denucé three years ago in his monograph "Les Origines de la Cartographie Portuguaise" (see *Journal*, vol. 33, p. 686), with which Dr. Kretschmer does not seem to be acquainted. The account of the atlas given by Dr. Kretschmer at once suggested that it must closely resemble the one described by Denucé (and ascribed by him with good reason to the Reinels), while a reference to the catalogue number showed the identity of the two. In treating of two atlases—both in his view the work of Battista Agnese—Dr. Kretschmer enters into some discussion of the general character of the work of that prolific cartographer, several of whose atlases he has himself brought to light. In his list printed in the *Zeitschrift* of the same society for 1896, he does not appear to include the unsigned and undated atlas in the Paris collection, which he now considers certainly the work of Agnese.* One of the items is a map of Europe and the basin of the Mediterranean by the Cretan cartographer Georgio Sideri or Calapoda, dated 1565. The most important work of this map-maker is the atlas of ten maps in the St. Mark's Library at Venice, a specimen of which was reproduced by Dr. Kretschmer himself in his atlas illustrating the Discovery of America. The maps of another atlas—in the Stockholm National Library—to which Dr. Kretschmer

* Harrisse, in his 'Discovery of America,' while discussing the productions of Agnese, places the unsigned Paris atlas among "counterfeits of the time, very poorly executed."

does not refer, were reproduced in colour by Nordenskiöld in his 'Periplus.' An anonymous and undated Portuguese atlas of twenty maps is an important item. It would seem to date probably from the latter part of the sixteenth century, as it contains the name Anian (as a region of North-West America), which only then began to come into vogue. A noteworthy peculiarity is the representation of a second strait (marked as "Estreito Novo") south of Terra del Fuego. Some of the later maps are by little-known authors, such as Domingo de Villarroel and Alvise Gramolin. Lastly, information is given on the cartographical productions of the various members of the family of Oliva, of which a considerable number are known.

## OBITUARY.

### Mr. Holt Hallett.

We much regret to record the death of Mr. Holt S. Hallet, for thirty years a Fellow of our Society, and at one time a frequent attendant at the evening meetings when subjects connected with his special field of interest, the Eastern borderlands of the Indian Empire and adjacent parts of South-Eastern Asia, were to be discussed. He had been ill for some time, and died in London on the 11th of last month.

Trained as a railway engineer, Mr. Hallett was engaged in his earlier years in railway construction in the north of England, but began his connection with the East in 1868, when he entered the Indian Public Works Department, under which he continued to be actively employed for the next twelve years. His duties having taken him to British Burma, where he was employed in engineering works for the control of the lower Irawadi, he became specially interested in questions relating to the extension of British influence in the parts of the Indo-Chinese peninsula adjacent to British territory. He consistently advocated the encouragement of trade relations with these by means of railways, and after his retirement in 1880 he devoted himself for some years to the furtherance of this object, in which he became associated with Mr. A. R. Colquhoun, also a zealous advocate of British railway enterprise in South-Eastern Asia. Returning to Burma in 1883, he organized an expedition for the survey of a route from Burma through the Siamese Shan States towards the Mekong river and Southern China. In this he was accompanied by Dr. Cushing, the well-known Shan scholar, who was, however, compelled by illness to turn back before the completion of the explorations. Mr. Hallett made a very successful journey, his route leading through districts then but little known, so that his surveys added much to our knowledge of their geography, while valuable observations were made on the languages, history, etc., of the region explored, which embraced the greater part of Northern Siam, the turning point being Kiang-Hsen on the Mekong. Among the geographical results was the determination of the courses of various upper branches of the Menam. Returning, Mr. Hallett descended the Meping and Menam to Bangkok. He described the journey at a meeting of this Society towards the end of 1885 (*Proceedings*, 1886, pp. 1 *et seq.*), his paper evoking an interesting discussion. A fuller personal narrative was embodied in his book entitled 'A Thousand Miles on an Elephant through the Shan States,' which appeared in 1890, while the main geographical results of his survey were given in the joint Report of himself and Mr. Colquhoun, in which the final scheme for the proposed railway—intended to connect both Maulmein and Bangkok with the Chinese frontier—were put forward. Mr. Hallett frequently took part in discussions following papers read at the Society on this part of the world.

## MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1911-1912.

*First Meeting, November* 6, 1911.—The Right Hon. Earl CURZON OF KEDLESTON, G.C.S.I., G.C.I.E., etc., President, in the Chair.

The paper read was:—

"The Norsemen in America." By Dr. Fridtjof Nansen, G.C.V.O.

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RESEARCH DEPARTMENT.

*November* 16, 1911.—Prof. J. L. MYRES in the Chair.

"Description of New Base-measuring Apparatus for New South Wales and Dera Dun," by Sir David Gill, K.C.B., F.R.S.; and "Invar Tapes," by Mr. Agar Baugh.

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## GEOGRAPHICAL LITERATURE OF THE MONTH.

*Additions to the Library.*

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Col. = Colonies.
Com. = Commerce.
C.R. = Comptes Rendus.
E. = Erdkunde.
G. = Geography, Géographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
Jb. = Jahrbuch.
Jber. = Jahresbericht.
k.k = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. (Mém.) = Memoirs, Mémoires.
Met. (mét.) = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. = (Riv.) = Review, Revue, Rivista.
S. = Society, Société, Selskab.
Sc. = Science(s).
Sitzb. = Sitzungsbericht.
T. = Transactions.
Ts. = Tijdschrift, Tidskrift.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

**A selection of the works in this list will be noticed elsewhere in the "Journal."**

### EUROPE.

**Alps.** **Grande.**

The Bernese Oberland in summer and winter: a guide. By Julian Grande. London: T. Nelson & Sons, 1911. Size 6½ × 4½, pp. 202. *Maps and Illustrations. Price* 3*s.* 6*d. net. Presented by the Publishers.*

**Austria—Dalmatia.** **Schubert.**

Geologische Führer durch Dalmatien. Von Dr. Richard Schubert. (Sammlung Geologischer Führer, xiv.) Berlin: Gebr. Borntraeger, 1909. Size 6½ × 4, pp. xxiv. and 176. *Maps, Illustrations, and Sections. Price* 5*m.* 80.

**Austria-Hungary.** **Baedeker.**

Austria-Hungary; with excursions to Cetinje, Belgrade, and Budapest. Handbook for travellers by Karl Baedeker. 11th edit. Leipzig (London: T. Fisher Unwin), 1911. Size 6½ × 4½, pp. xxxviii. and 602. *Map and plans.* *Price* 10*s.* *Presented by the Editor.*

**Finland.** **Finland Geographical Society.**

Société de Géographie de Finlande. Atlas de Finlande, 1910. Texte 2 vols. [Forming *Fennia: Bulletin de la Société de Géographie de Finlande*, vol. **30**.] Helsingfors, 1910–11. Size 10 × 6½, pp. (vol. 1) iv. and (870); (vol. **2**) vi. and 764. *Sketch-maps and Illustrations*; *also Atlas of* 55 *maps and plans* (size 17 × 12). *Presented by the Geographical Society of Finland.*

**Finland—Population.** **Gebhard.**

Subkomitén för den Obesuttna Befolkningen. Statistisk undersökning af social-ekonomiska förhållanden i Finlands landskommuner år 1901. II. Bostadsförhållandena. Af Hannes Gebhard. Helsingfors, 1910. Size 10½ × 7½, pp. viii., 72, and 146. *Presented by the Geographical Society of Finland.*

For part 3, see *Journal*, vol. **34**, p. 224.

**France.** **Gostling.**

Rambles around French châteaux. By Frances M. Gostling. London; Mills & Boon, [1911]. Size 8 × 5, pp. xiv. and 372. *Map and Illustrations.* *Price* 6*s.* *Presented by the Publishers.*

**France—Alps—Survey.** **Helbronner.**

Description géométrique détaillée des Alpes françaises. Par Paul Helbronner. Tome I. Chaîne méridienne de Savoie. Paris: Gauthier-Villars, 1910. Size 13½ × 10, pp. 508. *Index-map, Illustrations, and Diagrams.* *Presented by the Author.*

**France—Provence.** **Forrest.**

A tour through Old Provence. By A. S. Forrest. London: S. Paul & Co., [1911]. Size 8½ × 5½, pp. 288. *Illustrations.* *Price* 6*s. net.* *Presented by the Publishers.*

**Germany—Baltic Coast.** **Brückmann and Ewers.**

Beobachtungen über Strandverschiebungen an der Küste des Samlands. Von Dr. R. Brückmann und E. Ewers. I. Gr. Dirschkeim, Marscheiten und Kreislacken. Leipzig, etc.: B. G. Teubner, 1911. Size 10 × 7, pp. 12. *Maps and Illustrations.* *Price* 2*m.* *Presented by the Publisher.*

**Germany—Black Forest.** **Wylie.**

Rambles in the Black Forest. By I. A. R. Wylie. London: Mills & Boon, [1911]. Size 8 × 5, pp. viii. and 326. *Illustrations.* *Price* 6*s.* *Presented by the Publishers.*

**Russia.** **Graham.**

Undiscovered Russia. By Stephen Graham. London: John Lane, 1912 [1911]. Size 9 × 5½, pp. xvi. and 338. *Sketch-map and Illustrations.* *Price* 12*s.* 6*d. net.* *Presented by the Publisher.*

**Russian Empire—Coasts.** **General Hydrographic Dept.**

*Collection of hydro-meteorological observations* (*Zap. Hydrography*) **7** (1909): 427–500; **8** (1910): 335–399.

Observations du débâcle et de la congélation des mers en Russie. [In Russian; partly in French.]

**Spain.** **Bell.**

The magic of Spain. By Aubrey F. G. Bell. London: J. Lane, 1912 [1911]. Size 7½ × 5, pp. 264. *Price* 5*s. net.* *Presented by the Publisher.*

**Sweden—Kiruna.** *Petermanns M.* **57** (1911) [ii.]: 4–8. **Greim.**

Das Schwedische Eisenerzlager Kiruna. Von Dr. G. Greim. *Sketch-map, Section, and Illustrations.*

**Sweden—Underground waters.** *B.S. Belge Géol.* **24** (1910): *Mém.* 221–334. **Richert.**

Les eaux souterraines de la Suède. Par J. G. Richert. *Sketch-maps, Diagrams, and Sections.*

**Switzerland—Rhone Bassin.** **Romer.**

Mouvements épeirogéniques dans le haut bassin du Rhône et évolution du paysage glaciaire. Par E. Romer. (From *Bulletin de la Société Vaudoise des Sciences*

*Naturelles*, 5e S., vol. 47, Mars 1911.) Lausanne, 1911. Size 9 × 6, pp. 65–192. *Sketch-maps and Diagrams.*

**Turkey.** **Ferriman.**

Turkey and the Turks. By Z. Duckett Ferriman. London: Mills & Boon, 1911. Size 9 × 5¾, pp. x. and 334. *Illustrations. Price* 10*s.* 6*d. net. Presented by the Publishers.*

**United Kingdom.** **Unstead and Taylor.**

Geography of the British Isles. By J. T. Unstead and E. G. R. Taylor. (Based on the 'General and Regional Geography,' by the same Authors.) London: G. Philip & Son, 1911. Size 8½ × 5¾, pp. iv. and 60. *Sketch-maps and Sections. Price* 1*s.* 6*d. Presented by the Publishers.*

**United Kingdom—Coventry.** **Harris.**

The story of Coventry. By Mary Dormer Harris. (The Mediæval Towns Series.) London: J. M. Dent & Sons, 1911. Size 7 × 4¼, pp. xii. and 356. *Plan and Illustrations. Price* 4*s.* 6*d. net. Presented by the Publishers.*

**United Kingdom—Exmoor.** **MacDermot.**

The history of the Forest of Exmoor. By Edward T. MacDermot. Taunton: Barnicott & Pearce, 1911. Size 10 × 6½, pp. xii. and 480. *Maps (facsimile and original) and Illustrations. Price* 21*s. net. Presented by the Publishers.*

**United Kingdom—Phytogeography.** **Bevis and Jeffery.**

British plants: their biology and ecology. By J. F. Bevis and H. J. Jeffery. London: Alston Rivers, Ltd., 1911. Size 8½ × 5¾, pp. xii. and 331. *Illustrations. Price* 4*s.* 6*d. net. Presented by the Publishers.*

**United Kingdom—Phytogeography.** **Tansley.**

Types of British vegetation. By members of the Central Committee for the Survey and Study of British Vegetation. Edited by A. G. Tansley. Cambridge: University Press, 1911. Size 7½ × 5, pp. xx. and 416. *Sketch-map, Illustrations, and Sections. Price* 6*s. net. Presented by the Publishers.*

**United Kingdom—Surrey.** **Matthews.**

The highlands of South-West Surrey: a geographical study in sand and clay. By E. C. Matthews. ('Studies in Economics and Political Science,' edited by the Director of the London School of Economics and Political Science; No. 2 in the Series of Geographical Studies.) London: A. & C. Black, 1911. Size 9 × 5¾, pp. viii. and 124. *Map and Illustrations. Price* 5*s. net. Presented by the Publishers.*

## ASIA.

**Dutch East Indies.** **Cabaton.**

Java, Sumatra, and the other islands of the Dutch East Indies. By A. Cabaton. London: T. Fisher Unwin, 1911. Size 9 × 6, pp. xvi. and 376. *Map and Illustrations. Price* 10*s.* 6*d. net. Presented by the Publisher.*

**India.** **Murray.**

A handbook for travellers in India, Burma, and Ceylon, including the provinces of Bengal, Bombay, Madras, the United Provinces of Agra and Lucknow, the Punjab, Eastern Bengal, and Assam, the North-West Frontier Province, Baluchistan, and the Central Provinces, and the Native States of Rajputana, Central India, Kashmir, Hyderabad, Mysore, etc. 8th edit. London: J. Murray, 1911. Size 7 × 4¾, pp. cxvi. and 530. *Map, Plan, and Illustrations. Price* 20*s. Presented by the Publisher.*

**India.** **Strachey.**

India: its administration and progress. By Sir John Strachey. 4th edit., revised by Sir Thomas W. Holderness. London: Macmillan & Co., 1911. Size 9 × 6, pp. xxiv. and 568. *Map. Price* 10*s. net. Presented by the Secretary of State for India.*

**India—Baluchistan—Earthquake.** **Heron.**

*Records Geol. Surv. India* 41 (1911): 22–35.

The Baluchistan Earthquake of October 21, 1909. By A. M. Heron. *Map and Illustrations.*

**India—Himalaya.** **Forrester.**

A Four Weeks' Tramp through the Himalayas. A guide to the Pindari Glacier.

By J. Campbell Forrester. Calcutta, 1911. Size 6½ × 4½, pp. 50. *Illustrations and Sections.*

**India—Himalaya.** **Stebbing.**

Stalks in the Himalaya: jottings of a sportsman-naturalist. By E. P. Stebbing. London: J. Lane, 1912 [1911]. Size 9 × 5½, pp. xxviii. and 322. *Illustrations. Price* 12*s.* 6*d. net. Presented by the Publisher.*

**India—Kashmir.** *Records Geol. Survey India* **41** (1911): 115–144. **Middlemiss.**

Sections in the Pir Panjal Range and Sind Valley, Kashmir. By C. S. Middlemiss. *Sketch-map, Sections, and Illustrations.*

**Japan—Yezo—Usu-san.** **Omori.**

*B. Imp. Earthquake Investigation Com.* **5** (1911): 1–38.

The Usu-san Eruption and Earthquake and Elevation Phenomena. By Dr. F. Omori. *Sketch-maps, Diagrams, and Illustrations.*

See note in the September number, p. 316.

**Korea.** **Longford.**

The Story of Korea. By Joseph H. Longford. London: T. Fisher Unwin, 1911. Size 9 × 5½, pp. 460. *Maps and Illustrations. Price* 10*s.* 6*d. net. Presented by the Publisher.*

**Malay Archipelago.** **Ross.**

Sixty years' life and adventures in the Far East. By John Doll Ross. Two vols. London: Hutchinson & Co., 1911. Size 9 × 5½, pp. (vol. 1) xvi. and 364; (vol. 2) xii. and 412. *Sketch-map and Illustrations. Price* 21*s. net. Presented by the Publishers.*

**Malay Archipelago.** *Colonial Office J.* **5** (1911): 28–34. **Scheltema.**

The Rhio and Lingga Archipelago. By J. F. Scheltema.

**Philippines—Mangrove swamps.** **Bacon and others.**

*Philippine J. Sc.* **4** (1909) A: 205–210; **6** (1911) A: 45–61.

The Economic Possibilities of the Mangrove Swamps of the Philippines. By Raymond Bacon, Vicente O. Gana, and Robert R. Williams.

**Russian Central Asia.** **Curtis.**

Turkestan: "the Heart of Asia." By William Eleroy Curtis. London: Hodder & Stoughton, 1911. Size 8¾ × 5½, pp. 344. *Illustrations. Price* 12*s. net. Presented by the Publishers.*

**Russian Central Asia—Bokhara.** **Olufsen.**

The Emir of Bokhara and his country. Journeys and studies in Bokhara (with a chapter on my voyage on the Amu Daria to Khiva). By O. Olufsen. Copenhagen: Glydendal (London: W. Heinemann), 1911. Size 10 × 7, pp. x. and 598. *Map and Illustrations. Price* 21*s. net. Presented by the Publisher.*

**Turkey.** **Hakki-Bey.**

Hakki-Bey. De Stamboul à Bagdad: notes d'un homme d'État Turc. (Collection de la "Revue du Monde Musulman"). Paris: E. Leroux, 1911. Size 10 × 6½, pp. 112. *Illustrations. Presented by the Publisher.*

**Turkey.** **Hoffmeister.**

Durch Armenien: eine Wanderung, und Der Zug Xenophons bis zum Schwarzen Meere: eine militär-geographische Studie. Von E. v. Hoffmeister. Leipzig, etc.: B. G. Teubner, 1911. Size 10 × 7, pp. x. and 252. *Maps and Illustrations. Price* 8*m. Presented by the Publisher.*

**Turkey—Mesopotamia.** **Willcocks.**

The irrigation of Mesopotamia. By Sir W. Willcocks. London: E. & F. N. Spon, 1911. Size 10½ × 7, pp. 136. *Separate Portfolio* (Size 18 × 14) *of forty-six Maps, Sections, etc. Price* 20*s. Presented by the Author.*

## AFRICA.

**Africa—Tsetse.** **Austen.**

A handbook of the Tsetse-flies (Genus Glossina). By Ernest Edward Austen. London: Longmans & Co., 1911. Size 10 × 6, pp. x. and 110. *Map and Illustrations. Presented by the British Museum (Natural History).*

**Angola.** *La G., B.S.G. Paris* **23** (1911): 439–450. **Gruvel.**

L'Angola. Par A. Gruvel. *Illustrations.*

**Belgian Congo.** **Weeks.**

Congo life and folklore. By the Rev. John H. Weeks. London: Religious Tract Society, 1911. Size 8½ × 5½, pp. xxii. and 468. *Illustrations. Price 5s. net. Presented by the Publishers.*

**Belgian Congo—Ethnology.** **Hilton-Simpson.**

Land and peoples of the Kasai; being a narrative of a two years' journey among the cannibals of the equatorial forest and other savage tribes of the South-Western Congo. By M. W. Hilton-Simpson. London: Constable & Co., 1911. Size 9 × 6½, pp. xx. and 356. *Maps and Illustrations. Price 16s. net. Presented by the Publishers.*

**Belgian Congo—Katanga.** ——

Congo. Report for the year 1910. On the trade, etc., of the Katanga. (Diplomatic and Consular Reports, Annual, No. 4736; 1911.) London, 1911. Size 9½ × 6, pp. 14.

**Central Africa—Ethnography.** **Mecklenburg.**

Wissenschaftliche Ergebnisse der Deutschen Zentral-Afrika-Expedition 1907–1908 unter Führung Adolf Friedrichs, Herzog zu Mecklenburg. Band VII. (Forschungen im Nil-Kongo-Zwischengebiet, von Dr. Jan Czekanowski. 3. Bd.: Ethnographisch-Anthropologischer Atlas.) Leipzig: Klinkhardt und Biermann, 1911. Size 10½ × 7, pp. viii. and 44. *Presented by the Publishers.*

**Egypt—Historical.** **Souttar.**

The story of ancient Egypt and its neighbouring peoples the Hebrews, Phœnicia, Carthage. By Dr. Robinson Souttar. London: Hodder & Stoughton, [1911]. Size 7 × 6½, pp. 250. *Price 1s. net. Presented by the Publishers.*

**German East Africa.** **Uhlig.**

Die Ostafrikanische Bruchstufe und die angrenzenden Gebiete zwischen den Seen Magad und Lawa ja Mweri sowie dem Westfuss des Meru. (Wissenschaftliche Ergebnisse der Ostafrikanischen Expedition der Otto Winter-Stiftung.) Von Prof. Dr. Carl Uhlig. (Ergänzungsheft Nr. 2 der Mitteilungen aus den Deutschen Schutzgebieten.) Berlin: E. S. Mittler und Sohn, 1909. Size 13 × 9½, pp. 64. *Maps. Price 3m.*

**Gold Coast.** **Bowler.**

Gold Coast palaver: life on the Gold Coast. By Louis P. Bowler. London: J. Long, Ltd., [1911]. Size 7½ × 5, pp. 174. *Portrait. Price 2s. Presented by the Publishers.*

**Ivory Coast.** *Renseignements Col., Afrique française* (1911): 154–158. **Joseph.**

Le Littoral et les Lagunes de la Côte d'Ivoire. Par Gaston Joseph. *Sketch-map.*

**Nigeria, Southern—Surveys.** **Guggisberg.**

Handbook of the Southern Nigeria Survey and Text-book of topographical surveying in Tropical Africa. By Major F. G. Guggisberg. Edinburgh: W. & A. K. Johnston, 1911. Size 10 × 6, pp. xvi. and 246. *Map, Diagrams, and Illustrations. Price 3s. 6d. Presented by the Publishers.*

**North-East Africa.** **Bland-Sutton.**

Man and beast in Eastern Ethiopia, from observations made in British East Africa, Uganda, and the Sudan. By J. Bland-Sutton. London: Macmillan & Co., 1911. Size 9 × 6, pp. xii. and 420. *Illustrations and Sketch-map. Price 12s. net. Presented by the Publishers.*

**Rhodesia.** **Gouldsbury and Sheane.**

The great plateau of Northern Rhodesia; being some impressions of the Tanganyika plateau. By Cullen Gouldsbury and Hubert Sheane. London: E. Arnold, 1911. Size 9 × 6, pp. xxiv. and 360. *Map and Illustrations. Price 10s. net. Presented by the Publisher.*

**Somaliland.** **Hamilton.**

Somaliland. By Angus Hamilton. London: Hutchinson & Co., 1911. Size 9 × 5½, pp. xvi. and 366. *Portrait, Map, and Illustrations.*

**South Africa.** **Fyfe.**

South Africa to-day, with an account of modern Rhodesia. By H. Hamilton Fyfe. London: Eveleigh Nash, 1911. Size 9 × 5½, pp. 300. *Illustrations. Price 10s. 6d. net. Presented by the Publisher.*

**South Africa—Natives.** **Evans**

Black and white in South-East-Africa: a study in sociology. By Maurice S. Evans. London: Longmans, Green & Co., 1911. Size 9 × 6, pp. xviii. and 342. *Map. Price 6s. net. Presented by the Publishers.*

**Sudan.** **Tilho.**

République française: Ministère des Colonies. Documents scientifiques de la Mission Tilho (1906–1909). Tome II. Paris: Imprimerie Nationale, 1911. Size 11 × 7, pp. viii. and 632. *Maps, Sections, and Illustrations. Presented by Captain J. Tilho.*

**Uganda—Ethnology.** **Roscoe.**

The Baganda: an account of their native customs and beliefs. By the Rev. John Roscoe. London: Macmillan & Co., 1911. Size 9 × 6, pp. xx. and 548. *Plans and Illustrations. Price 15s. net. Presented by the Publishers.*

**West Africa—Boundary.** **Cottes.**

La Mission Cottes au Sud Cameroun (1905–1908). Exposé des résultats scientifiques, d'après les travaux des divers Membres de la Section française de la Commission de délimitation entre le Congo français et le Cameroun (frontière meridionale) et les documents étudiés au Museum d'Histoire Naturelle. Par le Capitaine A. Cottes. Préface par André Tardieu. Paris: E. Leroux, 1911. Size 11 × 8, pp. xvi. and 254. *Maps and Illustrations. Price 7fr. 50. Presented for the Author.*

## NORTH AMERICA.

**America—British Colonies.** **Bradley.**

Britain across the Seas: America. A history and description of the British Empire in America. By Arthur Granville Bradley. London: National Society's Depository, [1911]. Size 9½ × 6, pp. xvi. and 451. *Maps and Illustrations. Price 12s. 6d. net. Presented by the Publishers.*

**Canada—Historical.** **Tilby.**

The English people overseas. Vol. 3: British North America, 1763–1867. By A. Wyatt Tilby. London: Constable & Co., 1911. Size 8½ × 5½, pp. viii. and 442. *Price 6s. net. Presented by the Publishers.*

**Canada—Rockies.** **Schäffer.**

Old Indian trails: incidents of camp and trail life, covering two years' exploration through the Rocky mountains of Canada. By Mary T. S. Schäffer. Toronto: W. Briggs, 1911. Size 8 × 5½, pp. xiv. and 364. *Map and Illustrations. Presented by the Author.*

**United States—Colorado river.** **James.**

The Grand Canyon of Arizona; how to see it. By George Wharton James. London: T. Fisher Unwin, 1911. Size 8 × 5½, pp. xii. and 266. *Map, Illustrations, and Sections. Price 6s. net.*

**United States—Michigan—Boundaries.** **Miller.**

*B. American G.S.* **43** (1911): 339–351.

The establishment of Michigan's Boundaries: a study in Historical Geography. By George J. Miller. *Sketch-maps.*

See note in the Monthly Record, September, p. 319.

**United States—Mississippi.** **Chief of Engineers.**

Report by a Special Board of Engineers on survey of Mississippi River from St. Louis, Mo., to its mouth, with a view to obtaining a channel 14 feet deep and of suitable width, including a consideration of the survey of a proposed waterway from Chicago, Ill., to St. Louis, Mo., hitherto reported upon. Submitted by the Chief of Engineers to the Secretary of War. Washington, 1909. Size 9½ × 6, pp. 532. *Maps and Diagrams; also separate Atlas of Maps, Plans, Sections, and Diagrams* (size 25 × 40; 52 pls.). *Presented by Mr. R. B. Dunwoody, Royal Commission on Canals and Waterways.*

**United States—New York.** *B. American G.S.* **43** (1911): 351–360. **Harper.**

The Hempstead Plains: A natural prairie on Long Island. By Roland M. Harper. *Illustrations.*

**United States—Ohio—Geology.** *J. Geology* **19** (1911): 257–269. **Hyde.**

The ripples of the Bedford and Berea formations of Central and Southern Ohio,

with notes on the paleogeography of the epoch. By Jesse E. Hyde. *Sketch-map and Illustration.*

**United States—Sierras.** **Muir.**

My first summer in the Sierra. By John Muir. London: Constable & Co., 1911. Size 8½ × 5½, pp. viii. and 354. *Illustrations. Price 7s. 6d. net. Presented by the Publishers.*

**United States—Surveys.** *U.S. Geol. Surv. B.* **465** (1911): pp. 178. **Hayes.**

The State Geological Surveys of the United States. By C. D. Hayes.

**United States—Washington—Mount Rainier.** **Williams.**

The mountain that was "God," being a little book about the great peak which the Indians named "Tacoma," but which is officially called "Rainier." By John H. Williams. 2nd edit. New York & London: G. P. Putnam's Sons, 1911. Size 10 × 7, pp. 146. *Maps and Illustrations. Price 6s. net. Presented by the Publishers.*

## CENTRAL AND SOUTH AMERICA.

**Argentine—Corrientes.** *Ann. S. Cient. Argentina* **70** (1910): 361-396. ———

Exploración y estudio de la laguna Iberá.

Little has hitherto been known of the hydrographical relations of this swamp, which were the object of the above exploration (see November number, p. 535).

**Argentine—Longitude.** *B.I.G. Argentino* **25** (1911): 79-85. **Lederer.**

Determinación de la Longitud entre Córdoba y Buenos Aires. Por Julio Lederer.

**Argentine—Pilcomayo.** *Ann. S. Cient. Argentina* **61** (1906): 305-328. **Fric.**

La cuestión geográfica del río Pilcomayo. Por Alberto Fric. *Sketch-map.*

**Argentine—Positions.** *B.I.G. Argentino* **25** (1911): 57-78. **Lederer.**

Catorce Latitudes y Longitudes en la parte Oriental de la República. Por Julio Lederer.

**Argentine and Brazil—Frontier.** *B.I.G. Argentino* **25** (1911): 86-104. **(Sanchez.)**

La Frontera Argentino Brasileña. El Alegato del Brasil. (De la Obra La Frontera Argentina Brasileña—Estudios y demarcación general—1887, 1904. Por el Ingeniero Don Zacarías Sanchez.)

**Argentine Republic.** *B.I.G. Argentino* **25** (1911): 24-56. **Morales.**

La República Argentina. Pequeño Cuadro Geo-Paleontologico. Por Elina G. A. de Correa Morales. *Sketch-map and Diagram.*

**Bolivia—Minerals.** **Blanco and Ballivián.**

Dirección General de Estadística y Estudios Geográficos. Monografía de la Industria Minera en Bolivia. Por Pedro Aniceto Blanco. Prólogo de Sr. Manuel V. Ballivián. La Paz, 1910. Size 9 × 6, pp. x. and 404. *Map. Presented by the Dirección General de Estadística.*

**Bolivia and Peru.** **Hauthal.**

*W. Veröffentl. Ges. Erdk. Leipzig* **7** (1911): pp. x. and 248.

Reisen in Bolivien und Peru, ausgeführt 1908 . . . Von Rudolf Hauthal. *Maps and Illustrations.*

**Brazil—São Paulo—Phytogeography.** **Usteri.**

Flora der Umgebung der Stadt São Paulo in Brasilien. Von Dr. A. Usteri. Jena: G. Fischer, 1911. Size 10 × 6½, pp. iv. and 272. *Map and Illustrations. Price 7m. Presented by the Publisher.*

**British Guiana.** **Rodway.**

In the Guiana forest; studies of nature in relation to the struggle for life. By James Rodway. New . . . edition. London: T. Fisher Unwin, 1911. Size 8½ × 5½, pp. 326. *Illustrations. Price 7s. 6d. net. Presented by the Publisher.*

**Central America—Historical.** **Esquemeling.**

The buccaneers of America: a true account of the most remarkable assaults committed of late years upon the coasts of the West Indies by the buccaneers of Jamaica and Tortuga (both English and French). Wherein are contained more especially the unparalleled exploits of Sir Henry Morgan, our English Jamaican hero, who sacked Porto Bello, burnt Panama, etc. By John Esquemeling . . .

London: G. Allen & Co., 1911. Size 9½ × 6½, pp. xxxvi. and 508. *Facsimile Maps and Illustrations. Price* 15*s. Presented by the Publishers.*

A page for page re-issue, but on smaller and lighter paper, of the edition brought out by Sonnenschein in 1893. In the list of editions printed at the back of the title-page the quite erroneous statement is made that the book was reprinted entire as vol. 4 of Burney's famous work.

**Chile and Argentine.** **Skottsberg.**

The wilds of Patagonia: a narrative of the Swedish Expedition to Patagonia, Tierra del Fuego and the Falkland Islands in 1907–1909. By Dr. Carl Skottsberg. London: E. Arnold, 1911. Size 9 × 5½, pp. xx. and 336. *Maps and Illustrations. Price* 15*s. net. Presented by the Publisher.*

**Salvador.** **Martin.**

Salvador of the Twentieth Century. By Percy F. Martin. London: E. Arnold, 1911. Size 9 × 5½, pp. xvi. and 328. *Map and Illustrations. Price* 15*s. net. Presented by the Publisher.*

**South America.** **Clemencean.**

South America to-day. By Georges Clemenceau. London: T. Fisher Unwin, 1911. Size 9 × 5½, pp. 316. *Illustrations. Price* 12*s.* 6*d. net. Presented by the Publisher.*

## AUSTRALASIA AND PACIFIC ISLANDS.

**Australia, Eastern.** **Brady.**

The King's caravan: across Australia in a wagon. By E. J. Brady. London: E. Arnold, 1911. Size 9 × 6, pp. x. and 340. *Sketch-map and Illustrations. Price* 12*s.* 6*d. net. Presented by the Publisher.*

**New Zealand.** **Stout.**

New Zealand. By the Hon. Sir Robert Stout and J. Logan Stout. (Cambridge Manuals of Science and Literature.) Cambridge: University Press, 1911. Size 6½ × 5, pp. viii. and 186. *Illustrations. Price* 1*s. net. Presented by the Publishers.*

**New Zealand—Historical.** **Hempleman and Anson.**

The Piraki log (E Pirangi Ahan Koe), or diary of Captain Hempleman. With introduction, glossary, etc., by the present owner [F. A. Anson]. Oxford: H. Frowde, [1911]. Size 9 × 5½, pp. 172 (and 4). *Maps and Illustrations. Price* 6*s. net. Presented by the Publisher.*

**Queensland—North Coast.** **Banfield.**

My tropic isle. By E. J. Banfield. London: T. Fisher Unwin, 1911. Size 9 × 5½, pp. 316. *Illustrations. Price* 10*s.* 6*d. net. Presented by the Publisher.*

**Samoa—Climate.** **Tetens and Linke.**

Das Klima von Samoa. Von Otto Tetens und Franz Linke. (Ergebnisse der Arbeiten des Samoa-Observatoriums der K. Gesellschaft der Wissenschaften zu Göttingen, IV.) Berlin: Weidmann, 1910. Size 11 × 9, pp. 114. *Maps. Price* 10*s.*

**Tasmania—Minerals.** *Papers and P.R.S. Tasmania* (1910): 1–221. **Petterd.**

The Minerals of Tasmania. By W. F. Petterd.

## POLAR REGIONS.

**Arctic.** **Cook.**

My attainment of the Pole; being the record of the expedition that first reached the Boreal Center, 1907–1909, with the final summary of the Polar controversy. By Dr. Frederick A. Cook. New York: the Polar Publishing Co. [London: Arlen & Co.], 1911. Size 10 × 7½, pp. xx. and 604. *Sketch-maps and Illustrations, Price* 12*s.* 6*d. net. Presented by the Publishers.*

In no way more convincing than previous statements of the Author's case.

**Arctic—Barents sea.** **Orléans**

Duc d'Orléans. Campagne arctique de 1907. Journal de bord et physique du globe. (Par A. de Gerlache, A. Nippoldt, et G. Lüdeling; pp. vi. and 104.) Étude lithologique de fonds recueillis dans les parages de la Nouvelle-Zemble. Par J. Thoulet (pp. 32). Brussels: C. Bullens, 1910–11. Size 13½ × 10½. *Maps and Illustrations. Presented by H.R.H. the Duke of Orleans.*

**Arctic—Whaling cruise.** **Lindsay.**

A voyage to the Arctic in the Whaler *Aurora*. By David Moore Lindsay. Boston [Mass.]: Dana Estes & Co. 1911. Size 8½ × 5½, pp. 224. *Illustrations. Presented by the Author.*

## PHYSICAL AND BIOLOGICAL GEOGRAPHY.

**Climatology.** **Bonacina.**

Climatic control. By L. C. W. Bonacina. London: A. & C. Black, 1911. Size 7 × 4½, pp. viii. and 168. *Sketch-map, Illustrations, and Diagrams. Price* 2*s. Presented by the Author.*

**Geology.** **Cole.**

The changeful Earth; an introduction to the record of the rocks. By Grenville A. J. Cole. London: Macmillan & Co., 1911. Size 7 × 4½, pp. x. and 224. *Sketch-maps and Illustrations. Price* 1*s.* 6*d. Presented by the Publishers.*

**Geology—Photographs.** **Watts and Reynolds.**

*Rep. British Ass., Sheffield* 1910 (1911): 142–159.

Photographs of Geological Interest. Seventeenth Report. (Drawn up by Professors W. Watts and S. H. Reynolds.)

**Geomorphology.** *Riv. G. Italiana* **18** (1911): 192–204. **Azzi.**

Note di Paleogeografia (evoluzione dei contorni delle terre emerse). Del dott. Girolamo **Azzi**. *Sketch-maps.*

**Geomorphology.**

Atlas photographique des formes du relief terrestre. Choix de Documents Morphologiques caractéristiques accompagnés de Notices Scientifiques. Première Circulaire du Comité désigné pour en assurer l'execution par le IX^e^ Congrès International de Géographie. Lyon, 1910. Size 10 × 6½, pp. 12. *Illustrations.*

See note in vol. **37**, p. 217.

**Glacial Deposits.** *J. Geology* **19** (1911): 223–231. **Berkey and Hyde.**

Original ice structures preserved in unconsolidated sands. By Charles P. Berkey and Jesse E. Hyde. *Illustrations and Diagrams.*

**Glacial Erosion.** *J. Geology* **19** (1911): 193–216. **Chamberlin and Chamberlin.**

Certain phases of Glacial Erosion. By Thomas C. Chamberlin and Rollin T. Chamberlin. *Illustrations.*

**Meteorology.** **Busk.**

What will the weather be? The amateur forecaster's vade mecum. By H. G. Busk. 2nd edit. Cambridge: W. Heffer & Sons, 1911. Size 7½ × 5, pp. 36. *Sketch-map, Illustrations, and Diagrams. Price* 6*d. net. Presented by the Publishers.*

**Physical Geography.** **Davis and Braun.**

Grundzüge der Physiographie. Auf Grund von William Morris Davis' "Physical Geography" neu bearbeitet von W. M. Davis und G. Braun. Leipzig, etc.: B. G. Teubner, 1911. Size 8½ × 5½, pp. xii. and 322. *Map, Illustrations, and Diagrams. Price* 6*m.* 60. *Presented by the Publishers.*

**Physical Geography.** **Supan.**

Grundzüge der physischen Erdkunde. Von Dr. Alexander Supan. 5 . . . Auflage. Leipzig: Veit & Co., 1911. Size 9 × 6, pp. x. and 970. *Maps, Illustrations, and Diagrams. Price* 18*m. Presented by the Publishers.*

## ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

**Anthropogeography.** **Haddon.**

The wanderings of peoples. By Dr. A. C. Haddon. (Cambridge Manuals of Science and Literature.) Cambridge: University Press, 1911. Size 6½ × 5, pp. viii. and 124. *Sketch-maps. Price* 1*s. net. Presented by the Publishers.*

**Anthropogeography.** **Semple.**

Influences of geographic environment; on the basis of Ratzel's system of Anthropogeography. By Ellen Churchill Semple. London: Constable & Co., 1911. Size 9 × 6, pp. xviii. and 684. *Maps. Price* 18*s. net. Presented by the Publishers.*

**Anthropogeography—Native races.** **Townshend.**

Asia and Europe. Studies presenting the conclusions formed by the author in a long life devoted to the subject of the relations between Asia and Europe. By

Meredith Townshend. 4th edit. London: Constable & Co., 1911. Size 8½ × 5½, pp. xxiv. and 404. *Price 5s. net. Presented by the Publishers.*

**Commerce—Historical.** **Coates.**

The old "country trade" of the East Indies. By W. H. Coates. London: Imray, Laurie, Norie, & Wilson, 1911. Size 7½ × 5, pp. xiv. and 206. *Map and Illustrations. Price 3s. 6d. net. Presented by the Publishers.*

**Commercial—Wheat.** **Rutter.**

Wheat-growing in Canada, the United States, and the Argentine, including comparisons with other areas. By W. P. Rutter. London: A. & C. Black, 1911. Size 8 × 5½, pp. x. and 316. *Sketch-maps and Diagrams. Price 3s. 6d. net. Presented by the Publishers.*

**Commercial Geography—Text-book.** **Brigham.**

Commercial geography. By Albert Perry Brigham. Boston and London: Ginn & Co., [1911]. Size 8 × 5, pp. xvi. and 470. *Maps, Illustrations, and Diagrams. Price 6s. Presented by the Publishers.*

**Historical—Magellan.** **Denucé.**

Magellan. La question des Moluques et la première circumnavigation du globe. Par Jean Denucé. Brussels: Hayez, 1911. Size 11½ × 9, pp. 434. *Maps (facsimile and original). Presented by the Author.*

## GENERAL.

**Black Sea lands.** **Curtis.**

Around the Black Sea: Asia Minor, Armenia, Caucasus, Circassia, Daghestan, the Crimea, Roumania. By William Eleroy Curtis. London: Hodder & Stoughton, 1911. Size 8½ × 5½, pp. viii. and 456. *Map and Illustrations. Price 12s. net.*

**Education—Exercises.** **Finch.**

Questions and exercises in geography. (Based on Heaton's 'Scientific Geographies.') I. The World, general, mathematical, physical, and economic geography. By Robert J. Finch. London: Ralph, Holland, & Co., [1911]. Size 7½ × 5, pp. xvi. and 48. *Sketch-maps and Diagrams. Price 6d. net. Presented by the Publishers.*

**Education—Exercises.** **Johnston.**

The scholar's geographical exercise book: the World. London: W. & A. K. Johnston, [1911]. Size 10 × 7½, pp. 46. *Outline Maps and Diagrams only. Price 4d. net. Presented by the Publishers.*

**Education—Text-book.** **Heaton.**

The Junior Scientific Geography. Book IV. The Mediterranean. By Ellis W. Heaton. London: Ralph, Holland, & Co., [1911]. Size 7½ × 5, pp. viii. and 112. *Sketch-maps, Illustrations, and Diagrams. Price 1s. net. Presented by the Publishers.*

**Education—Text-book.** **Fry.**

A text-book of geography. By G. Cecil Fry. (The University Tutorial Series.) 2nd edit. London: W. B. Clive, 1911. Size 7 × 5, pp. xxii. and 468. *Maps and Diagrams. Price 4s. 6d. Presented by the Publisher.*

**Education—Text-book.** **Young and Fairgrieve.**

A class book of practical geography. By Ernest Young and J. Fairgrieve. London: G. Philip & Son, 1911. Size 7½ × 5, pp. viii. and 160. *Sketch-maps and Diagrams. Price 1s. 6d. Presented by the Publishers.*

**Hints to Travellers.** **Blim and Rollet de l'Isle.**

Manuel de l'exploration: procédés de levers rapides et de détail; détermination astronomique des positions géographiques. Par E. Blim et M. Rollet de l'Isle. 2nd edit. Paris: Gauthier-Villars, 1911. Size 7 × 4½, pp. viii. and 256. *Diagrams. Price 5 fr.*

**Missions.** **Zwemer.**

The unoccupied mission fields of Africa and Asia. By Samuel M. Zwemer. New York: Student Volunteer Movement for Foreign Missions. [London: Marshall Bros.], 1911. Size 8½ × 5½, pp. xx. and 260. *Maps and Illustrations. Presented by the Author.*

**Mountaineering.** **Turner.**

My climbing adventures in four continents. By Samuel Turner. London: T.

Fisher Unwin, 1911. Size 9 × 5½, pp. 284. *Illustrations. Price* 12*s.* 6*d. net. Presented by the Publisher.*

**Travel.** **Aflalo.**

Behind the ranges: parentheses of travel. By F. G. Aflalo. London: M. Secker, 1911. Size 9 × 6½, pp. 284. *Illustrations. Price* 10*s.* 6*d. net. Presented by the Publisher.*

**Travel.** **Hyatt.**

Off the Main Track. By Stanley Portal Hyatt. London: T. Werner Laurie, 1911. Size 8½ × 5½, pp. viii. and 294. *Illustrations. Price* 12*s.* 6*d. net. Presented by the Publishers.*

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## NEW MAPS.

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### EUROPE.

**British Isles—England and Wales.** **Ordnance Survey.**

Sheets published by the Director-General of the Ordnance Survey, Southampton, from October 1 to 31, 1911.

**1-inch scale maps:—**

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**British Isles—Scotland.** **Bartholomew.**

Bartholomew's "Quarter Inch to Mile" Map of Scotland. Scale 1:253,440 or 1 inch to 4 stat. miles. Sheets: 2, Inverness & Skye; 3, Aberdeen and Grampians. Edinburgh: John Bartholomew & Co., [1911]. *Price, mounted on cloth,* 2*s. net each sheet. Presented by the Publishers.*

**Bulgaria.** **Bulgarian General Staff.**

General Staff map of Bulgaria. Scale 1:50,000 or 1·3 inch to 1 stat. mile. Sheets: x. 1, Vlasina; x. 2, Klisura; x. 3, Trn-Busintzi; x. 4, Brjenica; x. 5, Sofia-Kostinbrod; x. 6, Sofia-Kremikovtsi; xi. 1, Musulj; xi. 2, Bogica; xi. 3, Trekljana; xi. 4, Radomir; xi. 5, Vladaja; xi. 6, Grubljane; xii. 1, Pataríca; xii. 2, Besilevgrad; xii. 3, Goranovce; xii. 4, Izvor; xii. 5, Jarlovo; xii. 6, Samokov-Belcin; xiii. 1, Krstovdol; xiii. 2, Egri-Palanka; xiii. 3, Kostendil; xiii. 4, Kadinmost; xiii. 5, Dupnica; xiii. 6, Samokov-Dospej; xiv. 2, Car-Vrh (Sultan-tape); xiv. 3, Rakovo; xiv. 4, Bobosevo; xiv. 5, Dozovja; xiv. 6, Rilski-

Monastir; xv. 8, Carevoselo; xv. 4, Gabrovoblgarsko. Sofia: Royal Cartographical Institute, 1902–1910.

These sheets of the new General Staff map of Bulgaria include the area between 41° 50′ and 42° 50′ N. lat. and from the boundaries of Servia and Turkey on the west to 23° 30′ E. long. They thus embrace all the country to the south and west of Sofia. When complete the map will consist of about 330 sheets, and in addition to those already published, there are over eighty others in course of preparation. The map is printed in colours, and heights are shown by contours in brown at intervals of 10 metres. Each sheet covers an area of 10 minutes of latitude and 15 minutes of longitude. The style of production is very satisfactory, and the undertaking reflects great credit on the Royal Cartographical Institute of Sofia, who are responsible for the work.

**Europe.** **International Geological Commission.**

Carte géologique internationale de l'Europe. Scale 1:1,500,000 or to 23·6 stat. miles. Livraison VII. contenant les feuilles, D I., E V., E VI., E VII., F V., F VI., F VII. Berlin: Dietrich Reimer, 1911. *Presented through the Royal Society, London.*

With the exception of sheet D I, which embraces the northern part of Norway, the sheets contained in this portfolio cover the area between the north shores of the Black sea and Egypt, and from the Dardanelles to the western Caucasus and Lake Van. The geological features are shown in colours which have been well selected and most satisfactorily printed. Altogether there are now forty sheets published, nine only remaining to complete the map. The sheets embracing Germany, Austria, Switzerland, and the greater part of France are out of print, and second editions will soon be issued, with corrections.

**Finland.** **Société de Géographie de Finlande.**

Atlas de Finlande. Helsingfors: Société de Géographie de Finlande, 1911. *Presented by the Société de Géographie de Finlande.*

This atlas will be specially noticed.

**France.** **L'Aéro-Club de France.**

Carte de l'Aéro-Club de France. Publiée sous le haut patronage et avec le concours du Ministère des Travaux Publics. Scale 1:200,000 or 1 inch to 3·2 stat. miles. Sheets: Amiens, Laon, Mézières. Paris: Ed. Blondel la Rougery, [1911]. *Price 1.50 fr. each sheet. Presented by M. Ch. Lallemand.*

These are the first three trial sheets of the latest aeronautical map of France described by M. Ch. Lallemand in the *Geographical Journal* for last month; and the correct title is as above, and not as given on page 551, which is the title of the earlier French aeronautical map on the same scale.

## ASIA.

**China.** **Polignac and Audemard.**

Exploration du Comte Ch. de Polignac. Carte Provisoire du Yang tseu Kiang supérieur et du cours inférieur du Ya Long. Levée par le Capitaine de Frégate Audemard, Mars–Juin 1910. Scale 1:1,000,000 or 1 inch to 15·8 stat. miles. From *La Géographie*, vol. 26, No. 1. Paris: Masson & Cie., 1911.

**Russia.** **Ministry of Ways of Communication, St. Petersburg.**

Map of Southern Asiatic Russia. [In Russian.] Scale 1:4,200,000 or 1 inch to 66·3 stat. miles. 3 sheets. St. Petersburg: Ministry of Ways of Communication, 1911.

**Russia.** **Military Topographical Dept., St. Petersburg.**

Map of the Southern Frontier Regions of Asiatic Russia. [In Russian.] Scale 1:1,168,031 or 1 inch to 18·4 stat. miles. Sheet VIII. Vladivostok. St. Petersburg: Military Topographical Department, 1911.

This is a new edition.

**Sumatra.** **Topographical Bureau, Batavia.**

Schetskaart van de Residentie Lampongsche Districten. Scale 1:200,000 or 1 inch to 3·2 stat. miles. 4 sheets. Batavia: Topographische Inrichting, 1911.

A sketch-map of the extreme south-east part of Sumatra. The greater part of the region is unexplored or very little known, and under the circumstances a much smaller scale would have sufficed for the map, specially if the area on the southern

sheets, which is all that is shown in detail from surveys, had been given on an enlarged scale. The Krakatau group of islands appears on an inset.

**Turkey in Asia.** **Oppenheim.**

Zweite Reise in der Asiatischen Türkei 1899 von Dr. Max Freiherrn v. Oppenheim. Blatt III. Westlich von Aintab über Adana und Eregli nach Koniah. Scale 1 : 600,000 or 1 inch to 9·4 stat. miles. *Petermanns Mitteilungen*, Jahrgang 1911, II. Tafel 23. Gotha: Justus Perthes, 1911. *Presented by the Publisher.*

## AFRICA.

**Cameroons.** **Moisel.**

Karte von Kamerun, bearbeitet von M. Moisel. Scale 1 : 300,000 or 1 inch to 4·7 stat. miles. Sheet H 1, 2, Kribi. Berlin: Dietrich Reimer (Ernst Vohsen), 1911. *Presented by the Publishers.*

This sheet embraces the area between 2° and 3° 30′ N. lat., and in longitude extends from the Atlantic to the meridian of 12° E. Near the south is the boundary of Spanish Guinea and a small part of the region of French Congo which has just been ceded to Germany.

**Egyptian Sudan.** **Survey Office, Khartum.**

Map of the Egyptian Sudan. Compiled at the Survey Office, Khartum. Scale 1 : 250,000 or 1 inch to 3·9 stat. miles. Sheets: 35–M, Kosha; 36–M, Mohammed Gul; 45–D, Wadi Amur; 45–G, Berber; 55–A, El Safia; 65–C, El Buta. Khartum: Survey Office, 1908–1911. *Price* 10 *P.T. each sheet. Presented by the Director of Surveys, Khartum.*

**German East Africa.** **Jaeger.**

Das Hochland der Riesenkrater und die südlich anschliessenden Gegenden bis zum Hanang auf Grund eigener Aufnahmen und mit Benutzung der Aufnahmen von Abel, Bast, Baumann, Glauning, Graf v. Götzen, Hoesemann, Kohlschütter, Lademann, Methner, Reitzenstein, Schlobach, Sperling, Uhlig u. Uhlig's Karte den Ostafrikanischen Bruchstufe, bearbeitet, von Fritz Jaeger, konstruiert u. gezeichnet von W. Rux. Scale 1 : 150,000 or 1 inch to 2·4 stat. miles. *Mitteilungen a. d. deutschen Schutzgebieten*, Erganzungsheft No. 4, 1911, Karte 1. Berlin: E. S. Mittler & Sohn, 1911. *Presented by Herren P. Sprigade and M. Moisel.*

**German East Africa.** **Jaeger and Rux.**

Das Abflusslose Rumpfschollenland zwischen Iramba, Njarasasee, Umbugwe und Uflome. Auf Grund trigonometr. Aufnahmen von F. Jaeger und Wegeaufnahmen von Baumann, Dantz, Glauning, Graf v. Götzen, Hoesemann, Jaeger, Kannenberg, Kohlschütter, Lademann, Methner, v. Prittwitz, Schlobach, Seyfried, Sperling, Stadlbaur, Stuhlmann, Uhlig und anderen, bearbeitet von F. Jaeger und W. Rux. Scale 1 : 300,000 or 1 inch to 4·7 stat. miles. *Mitteilungen a. d. deutschen Schutzgebieten*, Erganzungsheft No. 4, 1911, Karte 2. Berlin: E. S. Mittler & Sohn, 1911. *Presented by Herren P. Sprigade and M. Moisel.*

**German East Africa.** **Prittwitz u. Gaffron.**

Karte des besiedelten Gebietes der Landschaft Turu. Hauptsachlich nach den Aufnahmen des Majors v. Prittwitz u. Gaffron 1903–1905, und mit Benutzung der Aufnahme von Dr. Baumann, Dr. Dantz, Ltn. Glauning, W. Janke, Hptm. Podlech, Hptm. Ramsay, Hptm. Seyfried, Ltn. Stadlbaur, Dr. Stuhlmann, Dr. Tornau, Oberstltn. v. Trotha, Wm. Werther, bearbeitet unter Leitung von P. Sprigade von R. Schultze. Scale 1 : 100,000 or 1 inch to 1·6 stat. mile. *Mitteilungen a. d. deutschen Schutzgebieten*, Bd. XXIV., 1911, Karte 4. Berlin: E. S. Mittler & Sohn, 1911. *Presented by Herren P. Sprigade and M. Moisel.*

**German East Africa.** **Prittwitz u. Gaffron.**

Das Massai Reservat südlich des Kilimandscharo. Auf Grundlage der astronomischen Ortsbestimmungen Prof. Dr. Kohlschütters und unter Mitbenutzung der von Prof. Dr. Uhlig geodätisch beobachteten Dreieckspunkte hauptsächlich nach den Aufnahmen des Majors v. Prittwitz u. Gaffron (Juli–Dezember 1906) konstruiert und gezeichnet von R. Schultze unter Leitung von M. Moisel. Scale 1 : 200,000 or 1 inch to 3·2 stat. miles. *Mitteilungen a. d. deutschen Schutzgebieten*, Bd. XXIII., 1910, Karte 7. Berlin: E. S. Mittler & Sohn, 1910. *Presented by Herren P. Sprigade and M. Moisel.*

**German East Africa.** **Prittwitz u. Gaffron.**

Skizze von Unjangwira (Bezirk Tabora) und den Nachbarlandschaften. Nach

eigenen Aufnahmen (Dez. 1909-Jan, 1910) konstruiert, gezeichnet und in den Rahmen der Karte 1:300,000 eigepasst von Major v. Prittwitz u. Gaffron. Scale 1:300,000 or 1 inch to 4·7 stat. miles. *Mitteilungen a. d. deutschen Schutzgebieten*, Bd. XXIV., 1911, Karte 5. Berlin: E. S. Mittler & Sohn, 1911. *Presented by Herren P. Sprigade and M. Moisel.*

**German South-West Africa.** **Görgens.**

Farm-Uebersichtskarte von dem Bezirk Gibeon und dem Distrikt Maltahöhe. Bearbeitet und gezeichnet im Bureau der Kaiserlichen Landesvermessung in Windhuk durch den Topograph Karsanke. Görgens, Kaiserlicher Vermessungsdirektor, Windhuk im Nov. 1910. Scale 1:200,000 or 1 inch to 3·2 stat. miles. *Mitteilungen a. d. deutschen Schutzgebieten*, Bd. XXIV., 1911, Karte 6. Berlin: E. S. Mittler & Sohn, 1911. *Presented by Herren P. Sprigade and M. Moisel.*

**German South-West Africa.** **Range.**

Karte des Gebietes längs der Lüderitzbahn zwischen Lüderitzbucht und Schakalskuppe nach aufnahmen des Regierungsgeologen Dr. Paul Range und mit Benutzung des veröffentlichten Materials. Bearbeitet von F. Heine unter Leitung von P. Springade. Scale 1:200,000 or 1 inch to 3·2 stat. miles. *Mitteilungen a. d. deutschen Schutzgebieten*, Bd. XXIV., 1911, Karte 1. Berlin: E. S. Mittler & Sohn, 1911. *Presented by Herren P. Sprigade and M. Moisel.*

**German South-West Africa.** **Range.**

Karte der Namib zwischen dem 27° südl. Breite und dem Oranje-Fluss, nach Aufnahmen des Regierungsgeologen Dr. Paul Range. Bearbeitet von E. Lewerenz unter Leitung von P. Sprigade. Scale 1:400,000 or 1 inch to 6·3 stat. miles. *Mitteilungen a. d. deutschen Schutzgebieten*, Bd. XXIV., 1911, Karte 2. Berlin: E. S. Mittler & Sohn, 1911. *Presented by Herren P. Sprigade and M. Moisel.*

**Southern Nigeria.** **Beverley.**

The Western Province of Southern Nigeria. Compiled by W. H. Beverley, Intelligence Officer, from provisional maps by the S.N. Survey, sketches by Civil and Military Officers, and from records in the S.N. Intelligence Dept. Scale 1:500,000 1 inch to 7·9 stat. miles. London: Edward Stanford, 1911. *Presented by Captain W. H. Beverley.*

Captain Beverley, whose map of the Eastern Province of Southern Nigeria was noticed in the *Geographical Journal* for May, 1910, has now dealt with the Western Province, and, taking advantage of all available information, including documents filed at the Intelligence Department at Lagos, has compiled a map that cannot fail to be of great service. An extensive series of theodolite traverses, published on the scale of 1:250,000 by the War Office, must naturally form the basis of a considerable area of this map, and Captain Beverley has also made use of railway surveys, marine charts, and numerous route surveys of civil and military officers. A plan of Lagos on an enlarged scale is given as an inset. Altogether, this is a most useful general map.

**Tripoli and Eastern Mediterranean.** **Langhans.**

Tripolis und das östliche Mittelmeer, der Schauplatz des italienisch-türkischen Konfliktes. Bearbeitet von Paul Langhans. Scale 1:3,500,000 or 1 inch to 55·2 stat. miles. Gotha: Justus Perthes, 1911. *Price* 1 *Mark.*

A general map of the countries bordering on the eastern Mediterranean, to illustrate the war between Italy and Turkey. The Asia Minor and Syrian railways are not up to date, some important lines being not shown at all.

## AMERICA.

**Canada.** **Department of the Interior, Ottawa.**

Sectional map of Canada. Scale 1:190,080 or 1 inch to 3 stat. miles. Sheets: 65, Macleod, revised to July 28, 1211; 221, Swan River, revised to June 12, 1911; 269, Prince Albert South, revised to July 12, 1911; 319, Prince Albert North, revised to July 20, 1911. Ottawa: Department of the Interior, Topographical Surveys Branch, 1911. *Presented by the Department of the Interior, Ottawa.*

**Canada.** **Dept. of the Interior, Ottawa.**

Resource map of the Dominion of Canada. Scale 1:12,500,000 or 1 inch to 197·3 stat. miles. Ottawa: Department of the Interior, 1911. *Presented by the Department of the Interior, Ottawa.*

A new edition of a small general map with resources indicated by red lettering. It is accompanied by twenty-two pages of statistical tables, and folded in a cover.

## AUSTRALASIA.

**New Guinea.** **Pilhofer, Flierl, and Meier.**

Karte der Durchquerung des Hinterlandes von Finschhafen (Kaiser-Wilhelms-Land) durch die Missionare G. Pilhofer und [L.] Flierl und Architekt H. Meier. Scale 1 : 400,000 or 1 inch to 6·3 stat. miles. *Petermanns Mitteilungen*, Jahrgang 1911, II., Tafel 24. Gotha : Justus Perthes, 1911. *Presented by the Publisher.*

## ANTARCTIC REGIONS.

**Antarctic Regions.** **Sprigade and Moisel.**

Wandkarte der Südpolargebiete. Bearbeitet von P. Sprigade und M. Moisel. Scale 1 : 12,000,000 or 1 inch to 189·4 stat. miles. 2 sheets. Berlin : Dietrich Reimer (Ernst Vohsen), [1911]. *Price* 8*m.*

A coloured wall-map of the Antarctic Regions measuring 48 inches by 68 inches. Tracks of all important expeditions are shown, and a brief note on each is given, with the symbol by which it is shown on the map. The expeditions of the various nations are distinguished by different colours. For purposes of general reference, and lectures in small class-rooms, the map should serve a useful purpose, specially at the present time, when so much interest is taken in Antarctic exploration.

## GENERAL.

**World.** **Bartholomew.**

A literary and historical atlas of Europe. By J. G. Bartholomew, LL.D. London : J. M. Dent & Sons, Ltd., [1911]. *Price* 1*s. net.*

A literary and historical atlas of America. By J. G. Bartholomew, LL.D. London : J. M. Dent & Sons, Ltd., [1911]. *Price* 1*s. net.*

These belong to the series [illegible]ference atlases prepared specially for the readers of "Everyman's Library," although they will be equally useful to all literary and historical students who are in frequent need of a handy atlas by their side when reading. It was found impossible to combine the whole series in one volume, and at the same time to treat the subjects dealt with at all adequately, so it has been decided to bring out a separate atlas for each continent. The maps and plans have been prepared under the superintendence of Dr. Bartholomew, and comprise, in addition to those showing general and physical geography, a set of historical maps, maps showing the progress of geographical discovery, a most instructive series of plans of important battles, maps illustrating districts connected with famous books and their authors, besides others of an equally important nature. At the end of each volume is a useful little gazetteer and index to place-names. The atlases measure 4½ by 7 inches, and are remarkably cheap at one shilling each.

**World.** **Habenicht.**

Justus Perthes' Taschen-Atlas. 48. Auflage (3. Abdruck). Vollständig neu bearbeitet von Hermann Habenicht. 24. Kolorierte Karten in Kupferstich. Mit geographisch-statistischen Notizen von Hugo Wichmann. Gotha : Justus Perthes, 1911.

**World.** **Hickmann.**

Hickmann's Geographical-Statistical Universal Pocket Atlas. 3rd edit. Vienna & Leipzig : G. Freytag & Berndt, 1912 [1911]. *Presented by the Publishers.*

**World.** **Kiepert.**

Henrici Kiepert : Formae Orbis Antiqui. 36 Karten mit kritischem Text und Quellenangabe. Bearbeitet und herausgegeben von Richard Kiepert. No. XXXIII. Imperium Romanum usque ad Traianum et Antoninos ; XXXVI. Asia et Africa secundum Ptolemaeum. Berlin : Dietrich Reimer (Ernst Vohsen), 1911. *Price* 3*m. each sheet.*

Nineteen sheets of this excellent atlas are now published, leaving seventeen to complete the work.

**World.** **Langhans.**

Funkentelegraphenkarten. III. Weltkarte. Nach amtlichen Quellen und privaten Ermittelungen. Equatorial scale 1 : 40,000,000 or 1 inch to 631·3 stat. miles. *Petermanns Mitteilungen*, Jahrgang 1911, II., Tafel 28. Gotha : Justus Perthes, 1911. *Presented by the Publishers.*

**World.** **Ordnance Survey of Great Britain.**

International Map of the World. Scale 1 : 1,000,000 or 1 inch to 15·8 stat. miles. Sheets : North O 29, The Hebrides ; North O 30, Scotland—the Highlands.

Southampton: Ordnance Survey Office, 1911. *Presented by the Director-General of the Ordnance Survey.*

It will be remembered that in November, 1909, a committee composed of representatives of various nations, met in London, at the invitation of the British Government, and under the presidency of Colonel S. C. N. Grant, C.M.G., R.E., then director-general of the Ordnance Survey, to consider the construction of the International Map of the World on the scale of 1 : 1,000,000. The result of the deliberations of this committee was that a mutual agreement was arrived at, and final arrangements made for the production of the sheets of the map. The resolutions adopted were issued as a report, and an abridgment of this was published in the *Geographical Journal* for August, 1910, together with index charts showing the arrangements of the sheets, with the conventional signs and scheme of colours for showing heights and depths. Since the meeting of this committee, a fair start has been made with the actual production of the sheets, thirty-four of which at least are known to have been taken in hand, and will be published before long. It is satisfactory to find that Great Britain is well to the fore in this matter, and Colonel C. F. Close, the newly appointed director-general of the Ordnance Survey, who was a member of the committee, and has all through shown great interest in the undertaking, has just issued the first two complete sheets of the map to be published. They are numbered North O 29 and North O 30, and include the whole of Scotland north of Dunfermline and Stirling. According to the arrangement, each degree is bounded by parallels and meridians, and embraces 4° of latitude and 6° of longitude. Heights and depths are shown by the tinted layer system, the colours being in accordance with the scheme finally adopted by the committee, and the contours selected are, for the land, 200, 400, 600, 800, 1000, 1200, and 1800 metres; while the depth of the water is shown by tints of blue and contours at 100-metre intervals apart. Upon each of the sheets is a very complete explanation of the symbols employed, and it is evident that great care has been taken in drawing, printing, and general production.

It may be interesting to mention the sheets that are at present known to be in course of production, in addition to the two just published, with the country undertaking the work, since from their numbers, and a reference to the index to the sheets published in the *Geographical Journal* for August, 1910, the areas they include will readily be seen. They are as follows: Austria, North, M 33; France, North, M 31; Great Britain, North, K 35; South, H 34; Hungary, North, L 34; Italy, North, K 33; United States, North, G 17, H 16, H 17, I 17, I 18, J 16, J 17, J 18, K 12, K 13, K 15, K 16, K 17, K 18, K 19, L 11, L 12, L 13, L 15, L 16, L 17, L 18, M 11, M 12, M 14, M 15.

**World.** **Wilson.**

Wilson's Folding Globe. Scale 1 : 40,000,000 or 1 inch to 640 stat. miles. *Price* 7*s.* 6*d.* Wilsons' Equal Scale Map of the World. Scale 1 : 40,000,000 or 1 inch to 640 stat. miles. *Price* 4*s.* 6*d.* Philips' Smaller School Room Map of the World on Mercator's Projection, for comparison with Wilson's Equal Scale Map of the World. Equatorial Scale 1 : 40,000,000 or 1 inch to 640 stat. miles. *Price* 4*s.* 6*d.* London: George Philip & Son, Ltd. *Presented by the Publishers.*

This folding globe, and the two maps of the world, are intended to be used for instruction in schools. The Equal Scale map consists of eight gores which, when printed on thin cardboard, and bent over at the poles, form the Folding Globe. In the construction of these gores, each of which includes 45° of longitude, the degrees of latitude are shown at their true lengths: latitude circles are drawn on each gore as straight lines parallel with the equator, and the meridians, instead of being curves, are a series of converging straight lines of 30° in length, meeting at the poles. By cutting out the wedge like spaces between the gores, and bending the series of gores over until they all meet at the poles, then fixing them in this position by a special rod and clip arrangement, a "globe" consisting of eight flat faces is formed. This scheme may have certain advantages as regards portability and cheapness of construction, but for educational purposes, to show the Earth as of this remarkable figure is hardly satisfactory.

The Equal Scale map of the world can be obtained on one sheet, to be hung on a wall; and to accompany it is published a map of the World on Mercator's projection, with the same equatorial scale as the equal Scale Map, for the purpose of showing the misleading features of the latter as regards relative size of areas. When placed side by side, the tremendous exaggeration of the areas in high latitudes on Mercator's projection is seen at once, and the comparison is decidedly instructive. To show more clearly this amount of exaggeration, Mr. Wilson has cut out pieces of cardboard,

which he calls "window diagrams," and which, when placed over the Mercator map at the different latitudes for which they have been prepared, show at a glance the true areas as compared with those given on the Mercator map. This is certainly an ingenious arrangement. Mr. Wilson's Folding Globe and "Equal Scale" map, or atlas, was described by him at the meeting of the British Association at Sheffield in 1910.

## CHARTS.

**Admiralty Charts.** **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, from October 1 to November 4, 1911. *Presented by the Hydrographer, Admiralty.*

**New Charts**—No. 1545, Mediterranean sea, Asia minor: the harbours of Marmarice and Karaghatch, 3*s*. 1120, Central Africa, Victoria Nyanza: Plans in Kavirondo gulf and entrance: Homa bay to Mbita passage, Homa bay, Kongo bay, Mbita passage, 3*s*. 1108, New Zealand, north island: River Thames [Waiho] 2*s*. 3505, Baltic sea: Högklubb to Goskhällan, 3*s*. 1821, France, north coast: Asnelles to Villers, including Caen roadstead, 3*s*. 2073, France, north coast: Cape Barfleur to Courseulles, 3*s*. 2613, France, north coast: Cape Levi to Fécamp, 3*s*. 2743, France, north coast: Rade de la Hougue (Plan: Port Barfleur), 3*s*. 847, Mediterranean: Cyprus, east coast: Famagusta and Salamis, Famagusta harbour, 2*s*. 620, North America, east coast: Penobscot bays, 3*s*. 2259, Central America, east coast: Savanilla harbour (Plans: Rio Magdalena, Puerto Columbia pier), 2*s*. 3252, Central Africa: Victoria Nyanza, northern portion, 5*s*. 2760, Sumatra, west coast: Acheh head to Chingkuk bay (Plans: Natal road, Melabu, Kwala Batu and Susu Susu, Bubun, Maki bay, Tampat Tuan bay, Trumon road, Baros road, Ayer Bangies road, Priaman road, Tiko road, Raja passage), 3*s*. 2578, Philippine islands: Eastern part of the Sulu or Mindora sea (Plan: Cuyo island anchorage), 3*s*. 6*d*. 1988, China, east coast: Approach to Samoa inlet, 3*s*. 1110, Australia, east coast: Norfolk and Philip islands, Sydney bay, 2*s*. 1999, New Zealand, south island: Ports Lyttelton and Levy, and Pigeon bay, Lyttelton harbour, 2*s*.

(*J. D. Potter, Agent.*)

**America, North.** **U.S. Weather Bureau.**

Meteorological chart of the Great Lakes, November, 1911. Washington: Department of Agriculture, U.S. Weather Bureau, 1911. *Presented by the U.S. Weather Bureau.*

**Atlantic.** **U.S. Weather Bureau.**

Meteorological chart of the North Atlantic Ocean, November, December, 1911. Ditto, South Atlantic Ocean, Summer Season—December, 1911, January, February, 1912. Washington: Department of Agriculture, U.S. Weather Bureau, 1911. *Presented by the U.S. Weather Bureau.*

**Atlantic, North.** **U.S. Hydrographic Office.**

Pilot chart of the North Atlantic Ocean, October, 1911. Washington: U.S. Hydrographic Office, 1911. *Presented by the U.S. Hydrographic Office.*

**Atlantic, North, and Mediterranean.** **Meteorological Office.**

Monthly Meteorological charts of the North Atlantic and Mediterranean, November, 1911. London: Meteorological Office, 1911. *Price 6d. each. Presented by the Meteorological Office.*

**Atlantic, South.** **U.S. Hydrographic Office.**

Pilot chart of the South Atlantic Ocean, December, 1911, January and February, 1912. Washington: U.S. Hydrographic Office, 1911. *Presented by the U.S. Hydrographic Office.*

**Indian Ocean.** **Meteorological Office.**

Monthly Meteorological charts of the Indian Ocean, November, 1911. London: Meteorological Office, 1911. *Price 6d. each. Presented by the Meteorological Office.*

**Indian Ocean.** **U.S. Hydrographic Office.**

Pilot chart of the Indian Ocean, November, December, 1911. Washington: U.S. Hydrographic Office, 1911. *Presented by the U.S. Hydrographic Office.*

**Indian Ocean.** **U.S. Weather Bureau.**

Meteorological chart of the Indian Ocean, November, December, 1911. Washington: Department of Agriculture, U.S. Weather Bureau, 1911. *Presented by the U.S. Weather Bureau.*

**Pacific.** **U.S. Hydrographic Office.**

Pilot chart of the North Pacific Ocean, December, 1911; ditto, South Pacific

Ocean, December, 1911, January and February, 1912. Washington: U.S. Hydrographic Office, 1911. *Presented by the U.S. Hydrographic Office.*

**Pacific.** **U.S. Weather Bureau.**

Meteorological chart of the North Pacific Ocean, November and December, 1911; ditto, South Pacific Ocean, Summer Season—December, 1911, January, February, 1912. Washington: Department of Agriculture, U.S. Weather Bureau, 1911. *Presented by the U.S. Weather Bureau.*

**Pacific, North.** **U.S. Hydrographic Office.**

Pilot chart of the North Pacific Ocean, November, 1911. Washington: U.S. Hydrographic Office, 1911. *Presented by the U.S. Hydrographic Office.*

## PHOTOGRAPHS.

**Algeria and Morocco.** **Hyam.**

Twenty-four photographs of Algeria and Morocco, taken by Joseph C. Hyam, Esq. *Presented by Joseph C. Hyam, Esq.*

A remarkably fine set of panoramic photographs, measuring $3\frac{3}{4} \times 12$ inches, with full descriptions, mounted in an album. They were taken during Mr. J. C. Hyam's recent travels, and form a valuable addition to the Society's collection of views of this part of Africa.

(1) Market-place, Tugurt; (2) Village of "Best-Best" in the environs of Tugurt; (3) Temasin; (4) Oasis of Urlana; (5) Domes of private mosques near Tugurt; (6) Crossing the Sahara desert; (7 and 8) The real "desert sea"; (9) View in the neighbourhood of Beni-Unif; (10) Oasis of Figig; (11) The Great Oasis of Figig; (12) Village of Zenagga; (13) Village of Udaghir; (14) Village of El-Maïz; (15) A reservoir at El-Maïz: (16) Part of the Oasis of Figig; (17–20) River Ued-Zusfana; (21 and 22) Ruins of Mansurah; (23) The Great Tower, Mansurah; (24) Mosque at Tlemsen.

**Federated Malay States and Siam.** **Adam.**

Fourteen photographs of the Federated Malay States and West Siam, taken by Frank Adam, Esq. *Presented by Frank Adam, Esq.*

Ten of these photographs are panoramas, measuring $3\frac{3}{4} \times 12$ inches. The remaining four measure $3\frac{3}{4} \times 4\frac{1}{2}$ inches. Mr. Adam has been careful to furnish full titles and descriptions, which is important.

(1) Perak river at Kuala Kangsar, looking up stream; (2) Perak river at Kuala Kangsar, looking down stream; (3) Gunong Bubo from Taiping hill; (4) Gunong Ijau from Taiping hill; (5) The plains of Larut; (6) View from summit of Gunong Ijau looking west; (7 and 9) Kelantan mountain ranges from Taiping hill; (8) The Dindings and gunong Bubo; (10) Gunong Pondok from the Bukit Gantang pass; (11) Scenery in the Pangna river, West Siam; (12) Pulo Pandji and entrance to Pangna river, looking up stream, West Siam; (13) Pulo Pandji and entrance to Pangna river, looking down stream, West Siam; (14) The Pangna monntains, West Siam.

**Victoria Falls.** **Clark.**

Fourteen photographs of the Victoria Falls, taken by Percy M. Clark, Esq., in July, 1911. *Presented by Percy M. Clark, Esq.*

An excellent set showing the remarkable features and construction of these falls. Mr. Clark has rendered them specially valuable by affixing to several of them a photograph of a sketch taken from about the same spot by Thos. Baines in July, which were sent to him by Prof. Balfour, of Oxford, who has recently examined the falls. The comparison is naturally extremely interesting.

(1) The entrance to the Gorge; (2) The first bend in the Gorge; (3 and 4) The second bend in the Gorge from the front; (5) The Leaping Water, the top part of the "Devil's Cataract"; (6) Falls from Garden island, now called Livingstone island; (7) Spray over falls at sunrise, low water; (8) Spray over falls at sunrise, high flood; (9) The only point where falls can be seen with a drop; (10) The rapids above the eastern end; (11) The main fall; (12) The Rainbow fall from the "Knife-edge"; (13 and 14) Falls from chasm.

**N.B. It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.**

## Note.

*This Map is from recent prismatic compass traverses by Mr. C. A. Reid & Mr. A. E. H. Reid, adj*
*latitudes and longitudes at the places given in the following list, observed by Mr. C. A. Reid on his retur*
*region in 1910-11 : and to the map of the Aruwimi River made from the surveys and astronomical obse*
*of Mr. R. L. Reid, in 1908-10, which was published in the Geographical Journal for July 1911. Bet*
*two last visits of Mr. C. A. Reid to the region he received instruction at this Society in astronomical obse*
*and made himself proficient at the work.*

*The observations were taken with a 5-inch transit theodolite, fitted with tangent micrometers. The l*
*are from circummeridian altitudes of N. & S. stars, and the longitudes from chronometric differences by E*
*stars, the times being taken by a half-chronometer watch. In all cases several pairs of stars were obser*
*the mean result accepted. The initial longitude adopted for the places on the following list is Commandant L*
*position of Ibembo, which in his report, "Mission Scientifique Congo-Nil," is given as 28° 40' 11*
*Greenwich.*

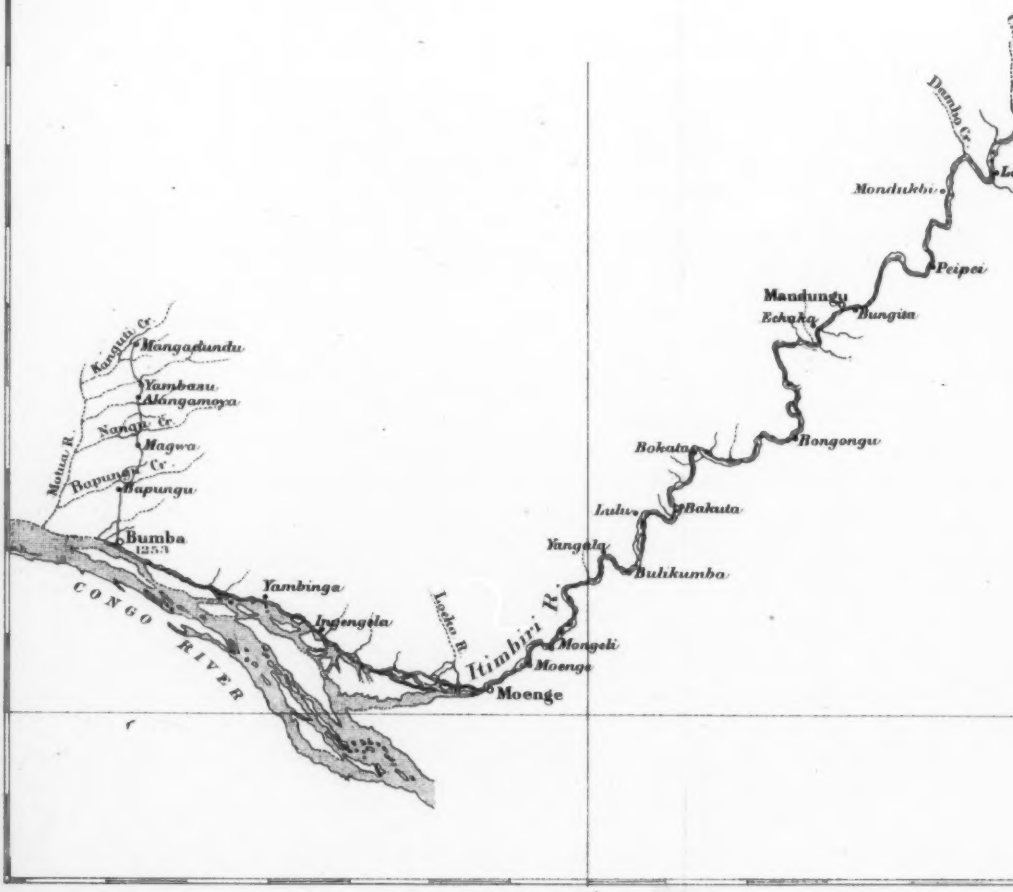
*Mr. C. A. Reid does not state how near the N. & S. stars for latitude, and the E. & W. stars for time*
*with one another, but he is a most careful observer, and there is no doubt that the results are quite satisfacto*

*In the northern and western parts of the map the prismatic compass traverses agreed within a mil*
*with the astronomically determined positions, but in the south-eastern part where Mr. C. A. Reid ha*
*no observations, considerable adjustment in longitude was found necessary, owing to the fact that he had pr*
*fitted his work to assumed positions, of which the longitudes have since been found to be much in error.*

*There are no heights given by Mr. C. A. Reid; those on the map are taken from Lemaire's barometr*
*hypsometrical observations, with the exception of that on the Aruwimi, which is from a barometrical deterr*
*by Mr. R. L. Reid.*

### List of Positions.

| Place. | Latitude N. | | | Longitude E. | | | |
|---|---|---|---|---|---|---|---|
| | ° | ′ | ″ | ° | ′ | ″ | |
| Mundungu .. .. .. | 2 | 25 | 08 .... | 23 | 15 | 10 | |
| Laka .. .. .. .. | 2 | 33 | 41 .... | 23 | 25 | 10 | |
| Ibembo .. .. .. .. | 2 | 38 | 25 .... | 23 | 40 | 11 | (*Lemaire*) |
| Go .. .. .. .. .. | 2 | 49 | 51 .... | 23 | 58 | 31 | |
| Jamba .. .. .. .. | 2 | 52 | 43 .... | 24 | 06 | 03 | |
| Dwaka .. .. .. .. | 2 | 51 | 14 .... | 24 | 20 | 53 | |
| Gunda .. .. .. .. | 2 | 49 | 53 .... | 24 | 25 | 33 | |
| Benge .. .. .. .. | | | .... | 24 | 39 | 08 | |
| Buta .. .. .. .. | 2 | 47 | 28 .... | 24 | 45 | 13 | |
| Gamu .. .. .. .. | 2 | 56 | 51 .... | 25 | 08 | 42 | |
| Basi .. .. .. .. | 3 | 06 | 06 .... | 25 | 27 | 51 | |
| Tituli .. .. .. .. | 3 | 16 | 31 .... | 25 | 33 | 07 | |
| Bama .. .. .. .. | 3 | 28 | 59 .... | 25 | 48 | 19 | |
| Bambili .. .. .. | 3 | 40 | 06 .... | 26 | 08 | 16 | |




*Conical Projection*

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. Reid has taken
he had previously
error.
barometrical and
ical determination

Lemaire)

BELGIAN CONGO

# THE ITIMBIRI RIVER

and Country between the

# WELLE AND ARUWIMI RIVERS

From prismatic compass traverses and astronomical observations

by

MESSRS C.A., A.E.H AND R.L. REID

Scale 1:750,000 or 1 Inch = 11·84 Stat. Miles

10 0 10 20 30 Miles

State Posts ..... Bumba
Villages (over 10 huts) ..... Yambinga
Rivers over 100 feet wide ..... Rapids
Routes .....
Heights in feet.

Peipei

Chimbi Cr.

Laka

Ekoko Cr.

Itimbiri River

Ibembo 1404

Miaka

Elonga Cr.

Zongodi

Dipau

Aketi

Aketi Cr.

Burjambul

Marigati

Binda Cr.

Go

Binda

Tele R.

Yoko Cr.

Likeri R.

Jambao

Bangarombe

Rubi River

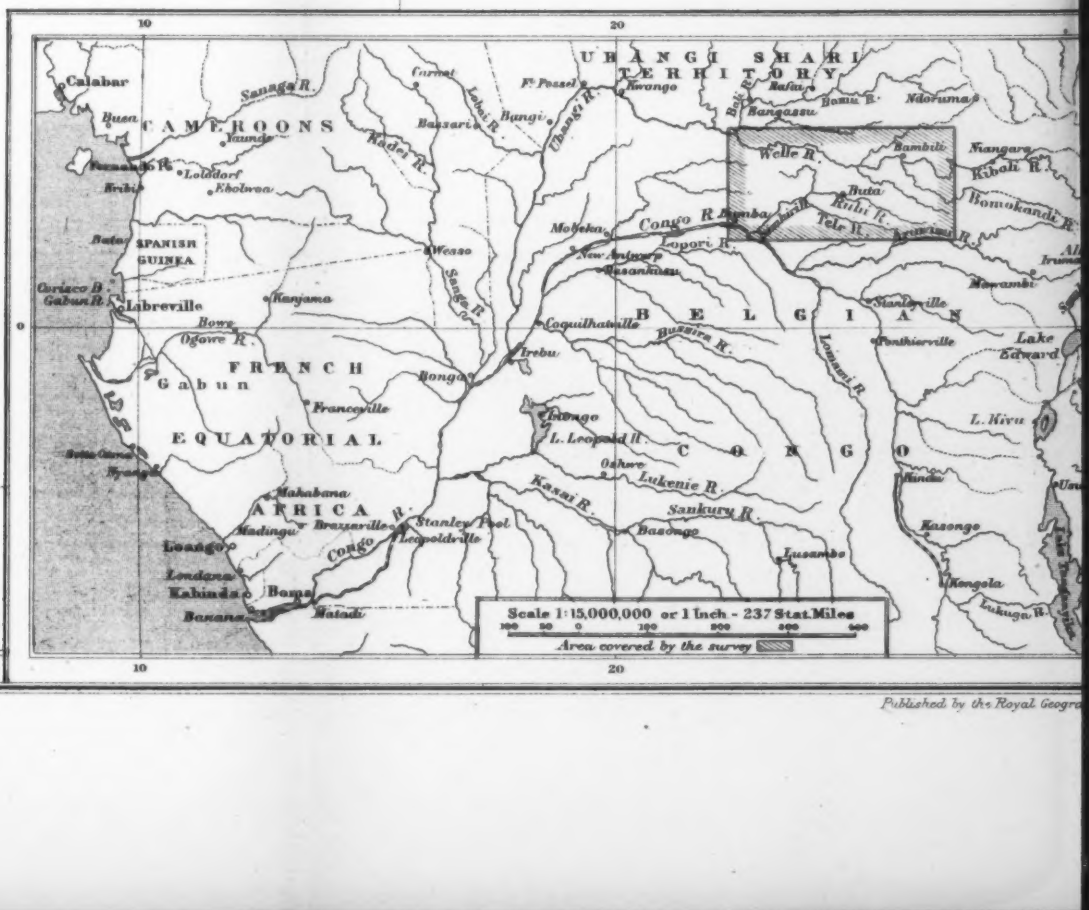
Dwaka

Gunda

Dongoko

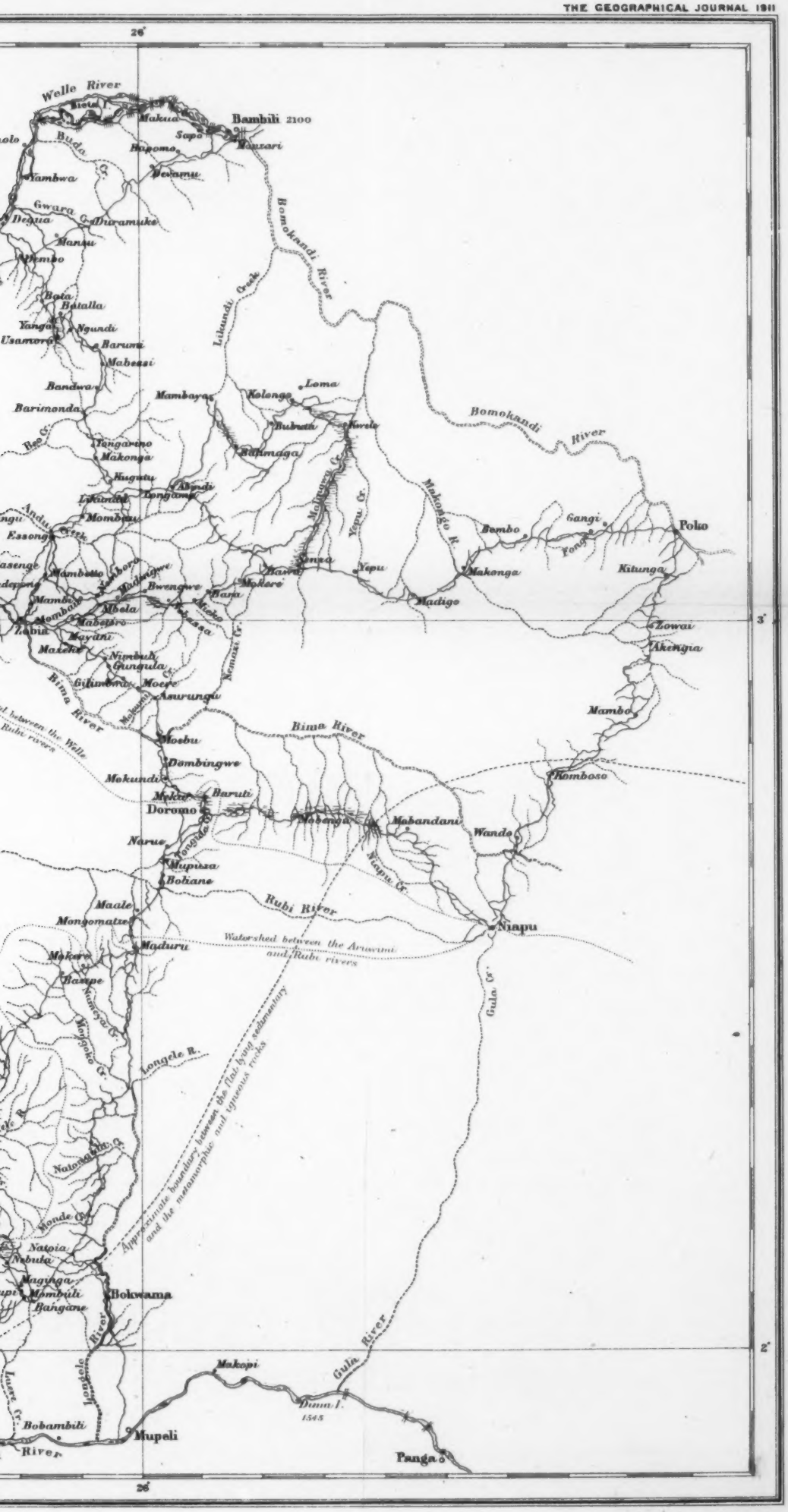
Kouli R.

Benge




Published by the Royal Geogra

tical Society.




ITIMBIRI RIVER

REID

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